FIG. 1

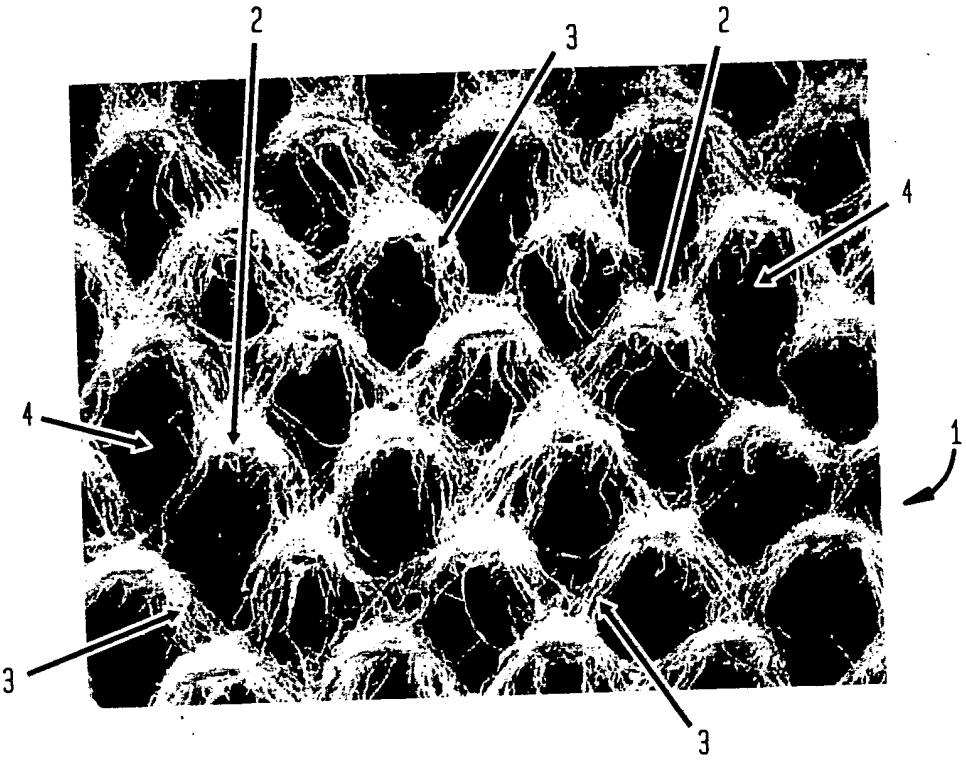


FIG. 2

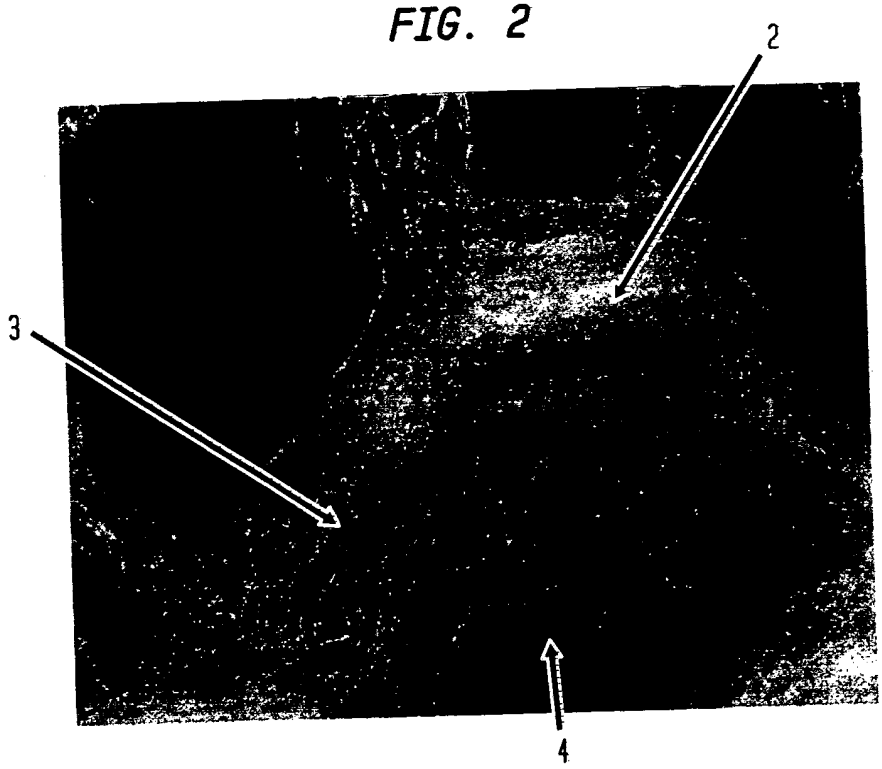


FIG. 3

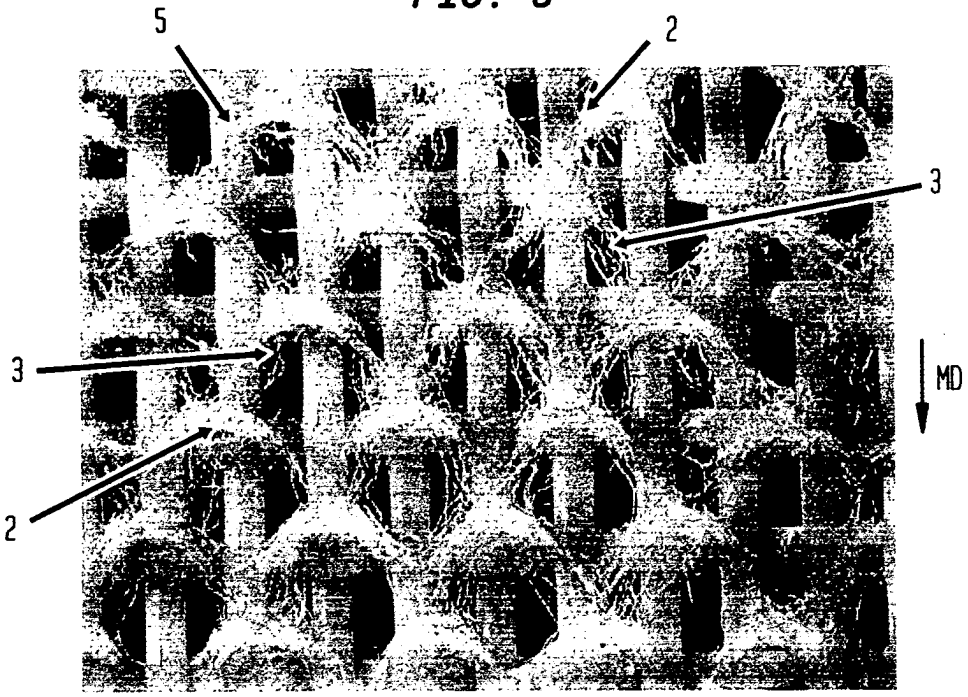


FIG. 4

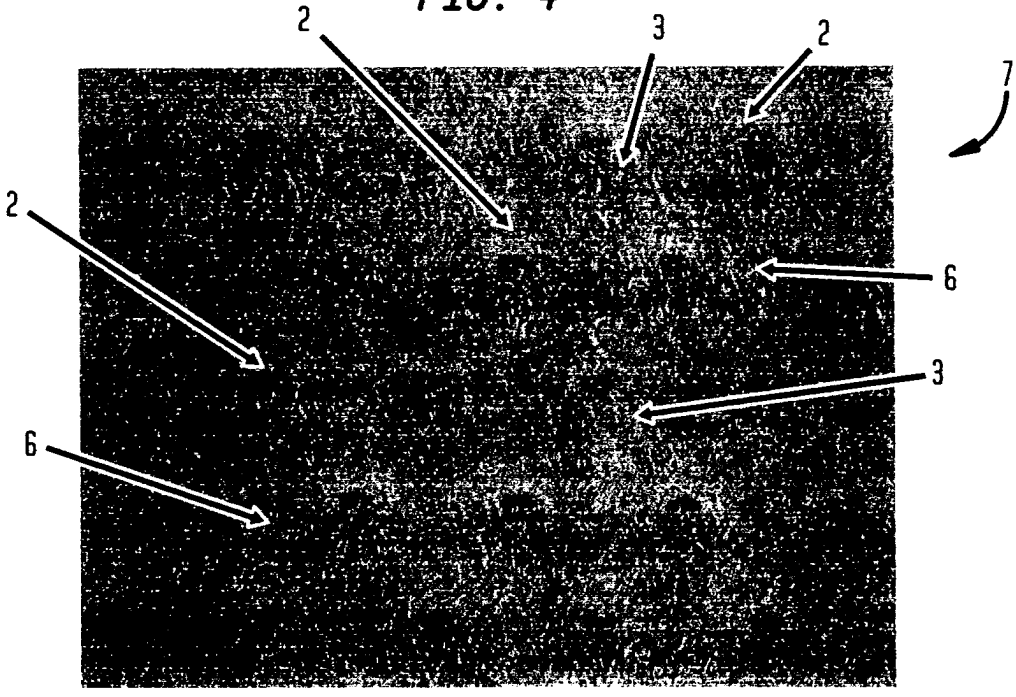


FIG. 5

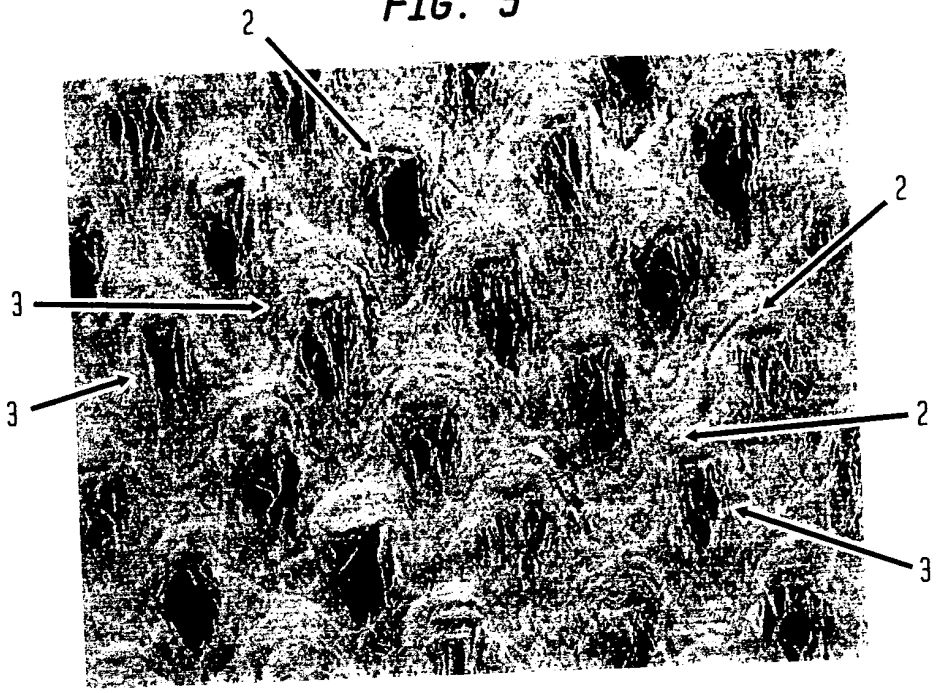


FIG. 6

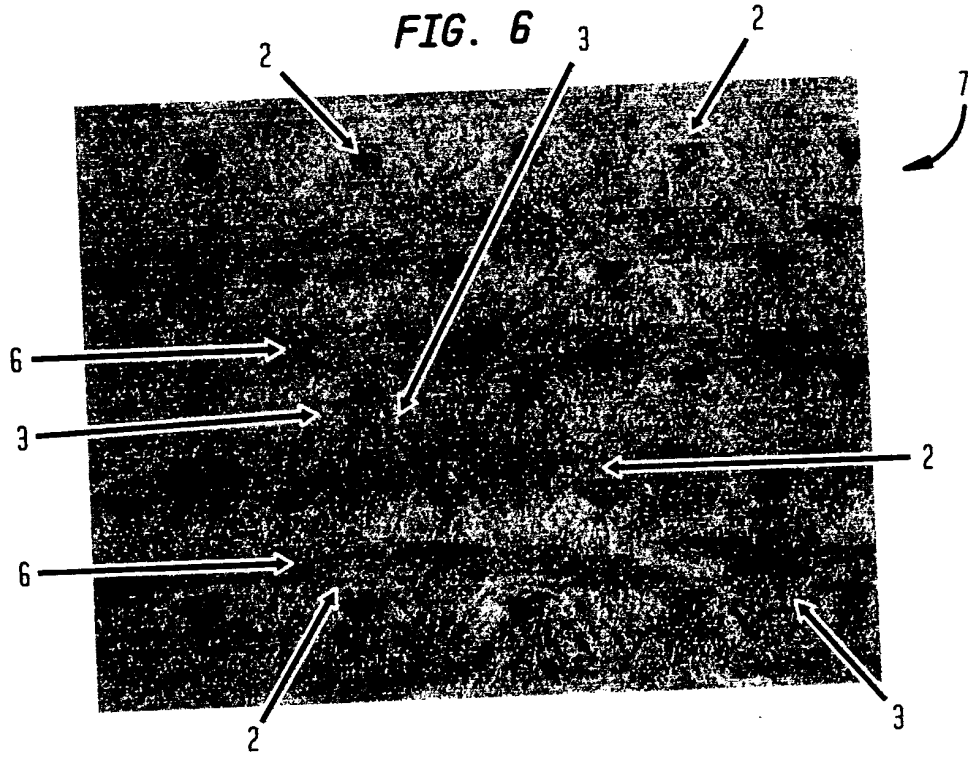


FIG. 7

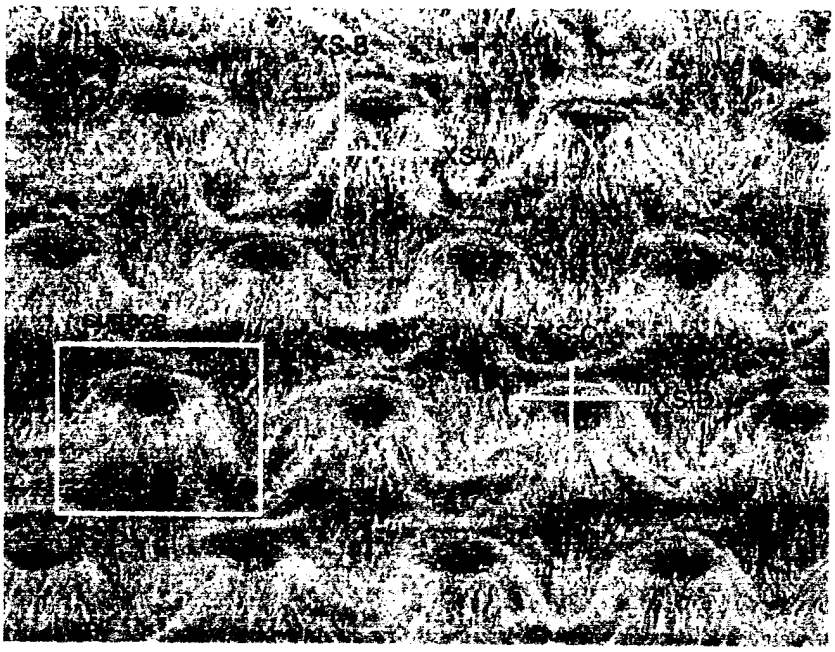


FIG. 8

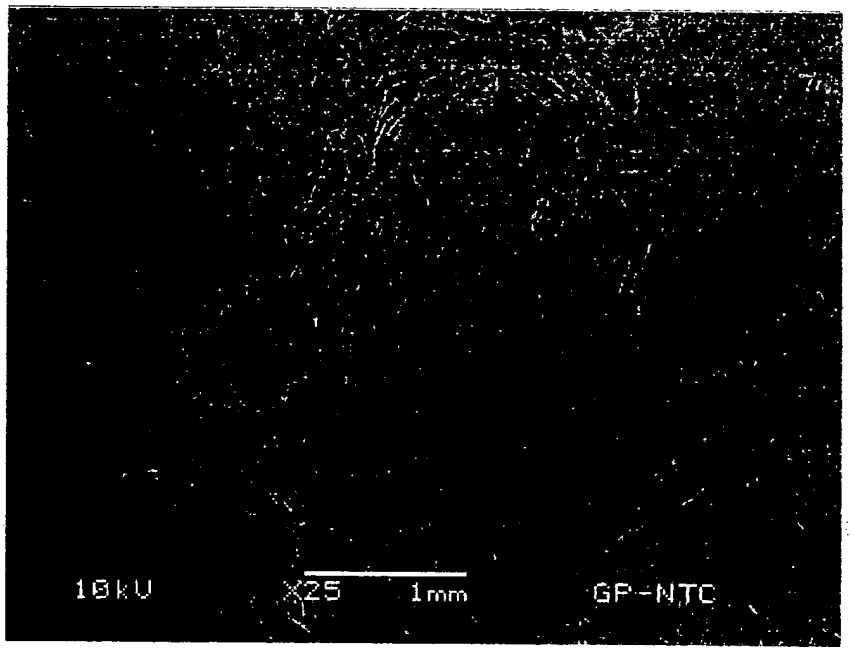


FIG. 9

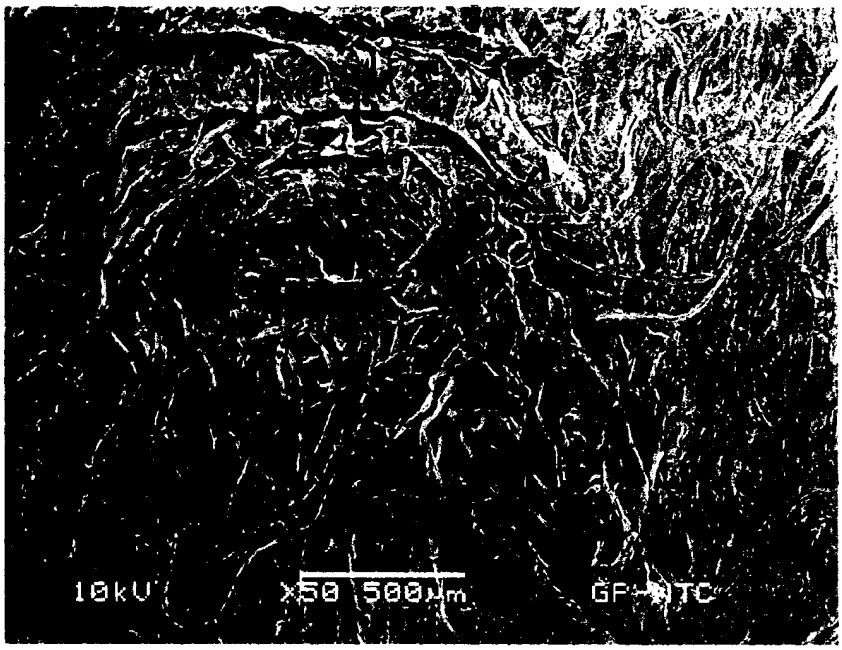


FIG. 10

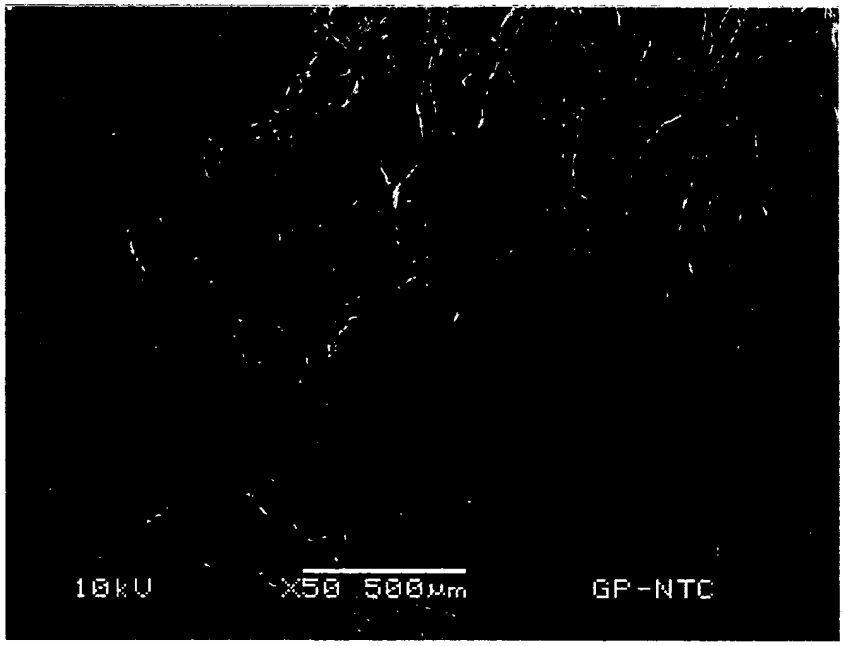


FIG. 11

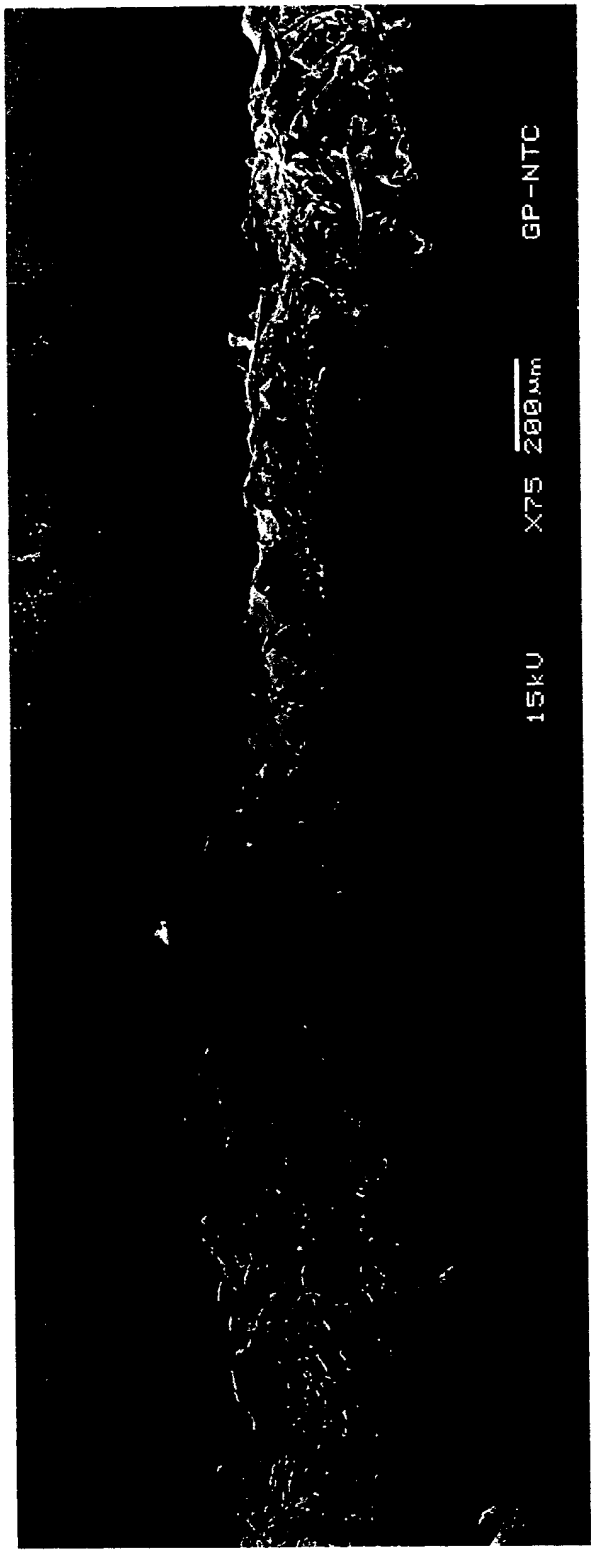
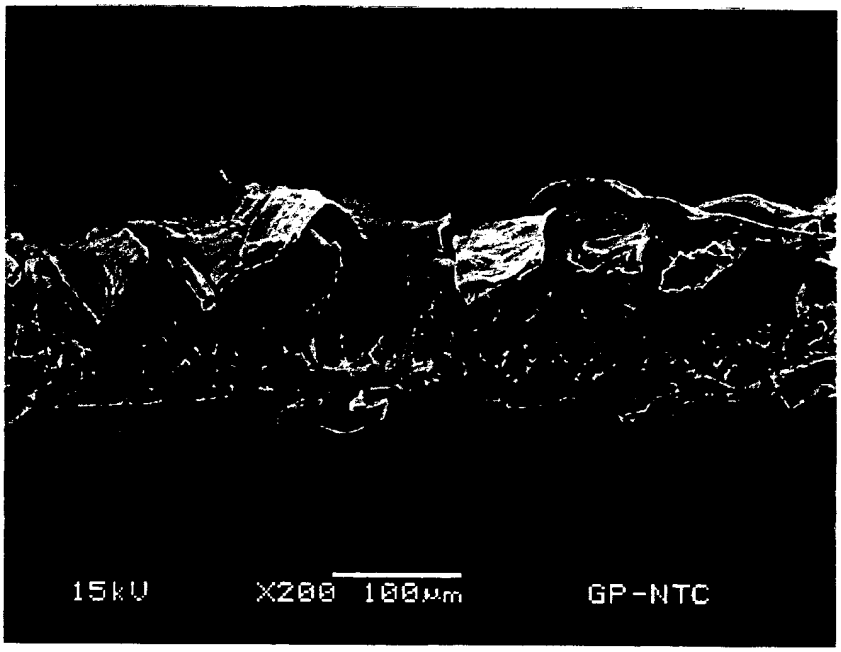


FIG. 12



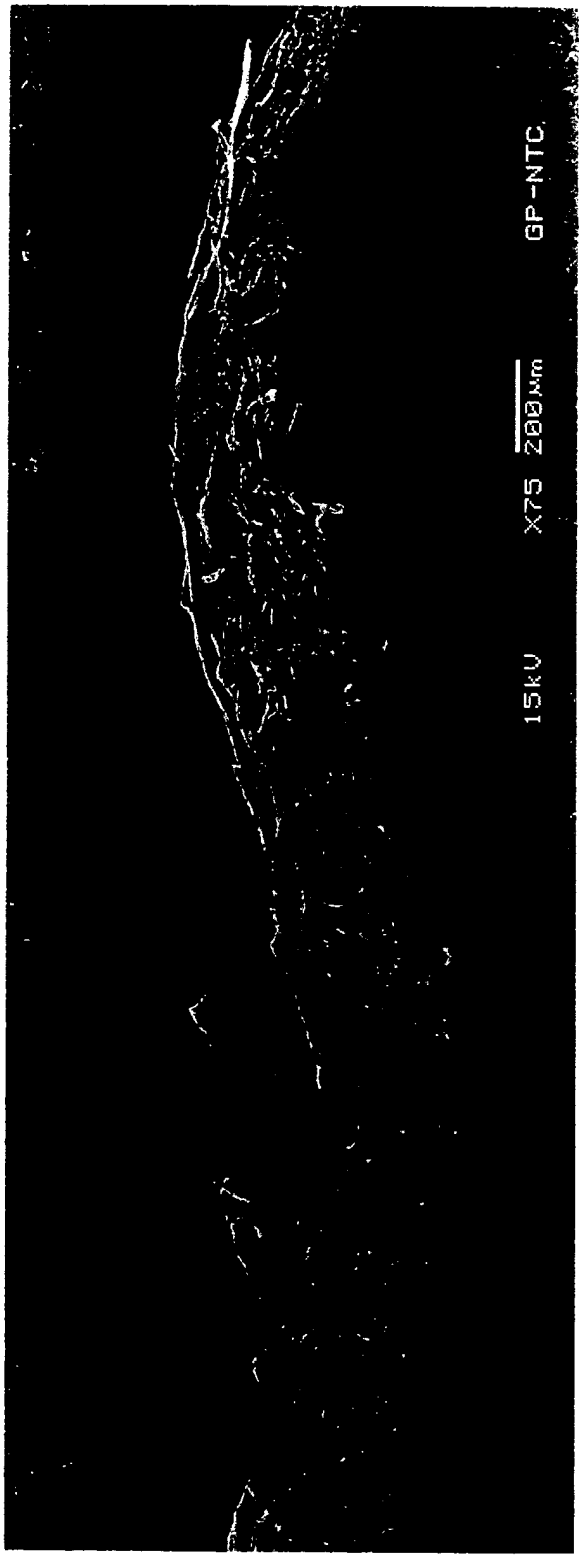
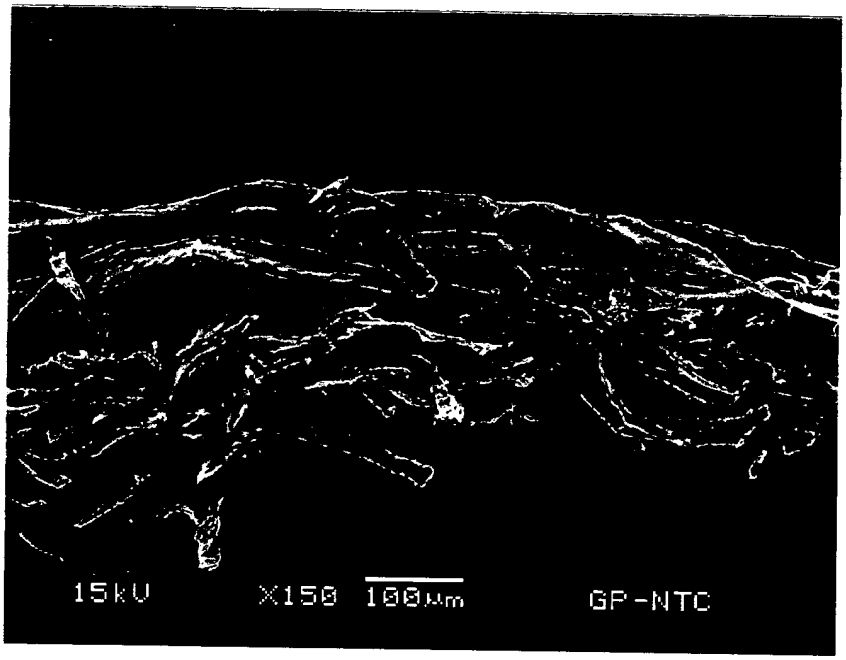


FIG. 13

FIG. 14



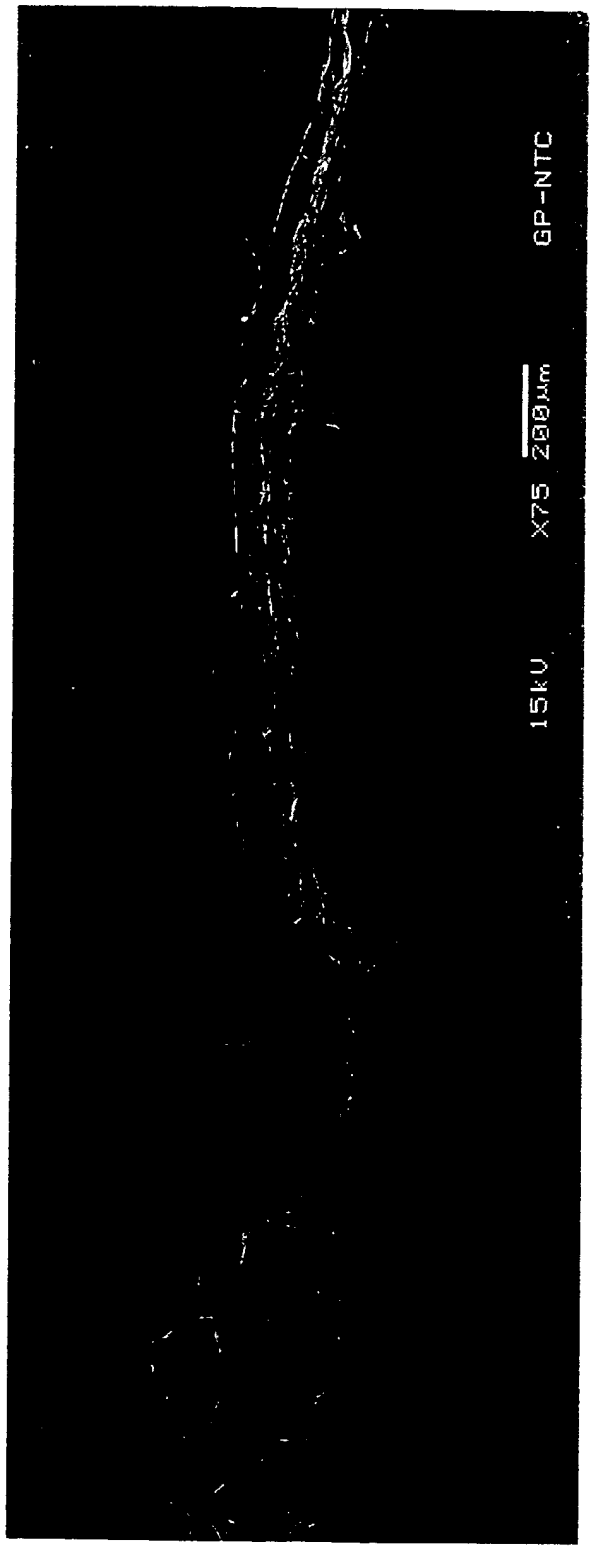
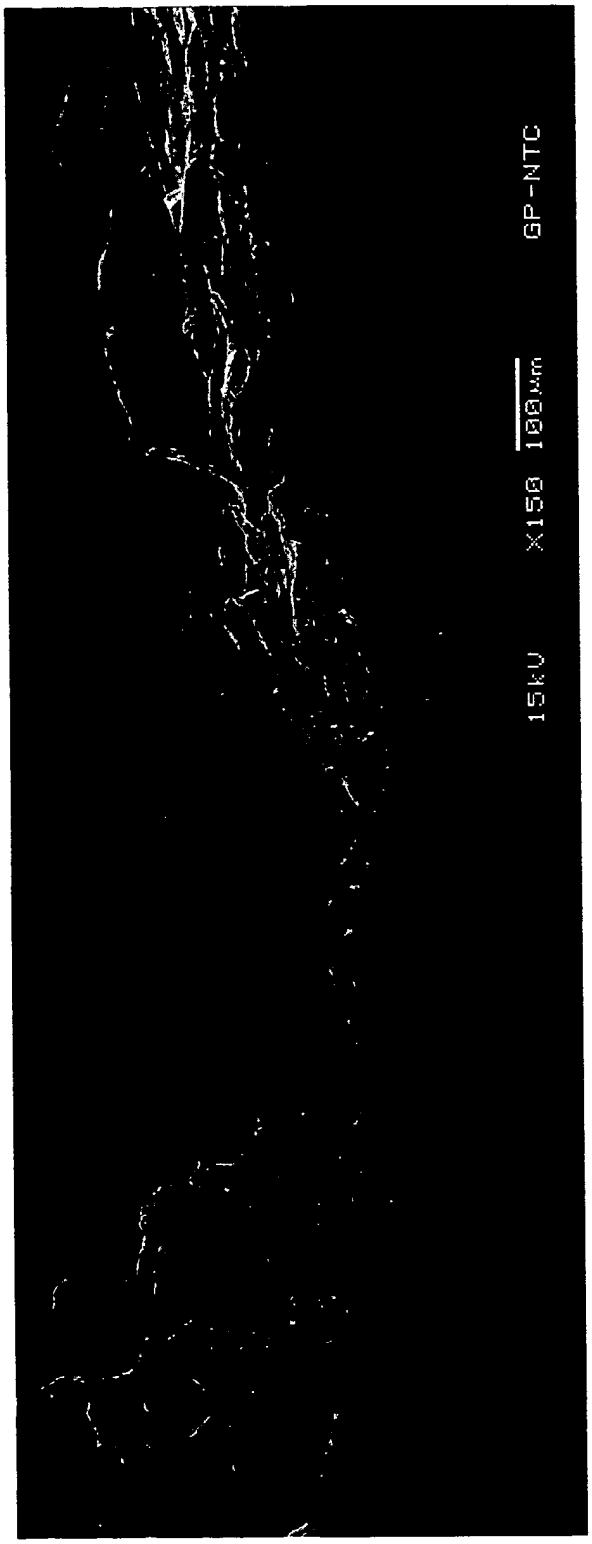


FIG. 15

FIG. 16



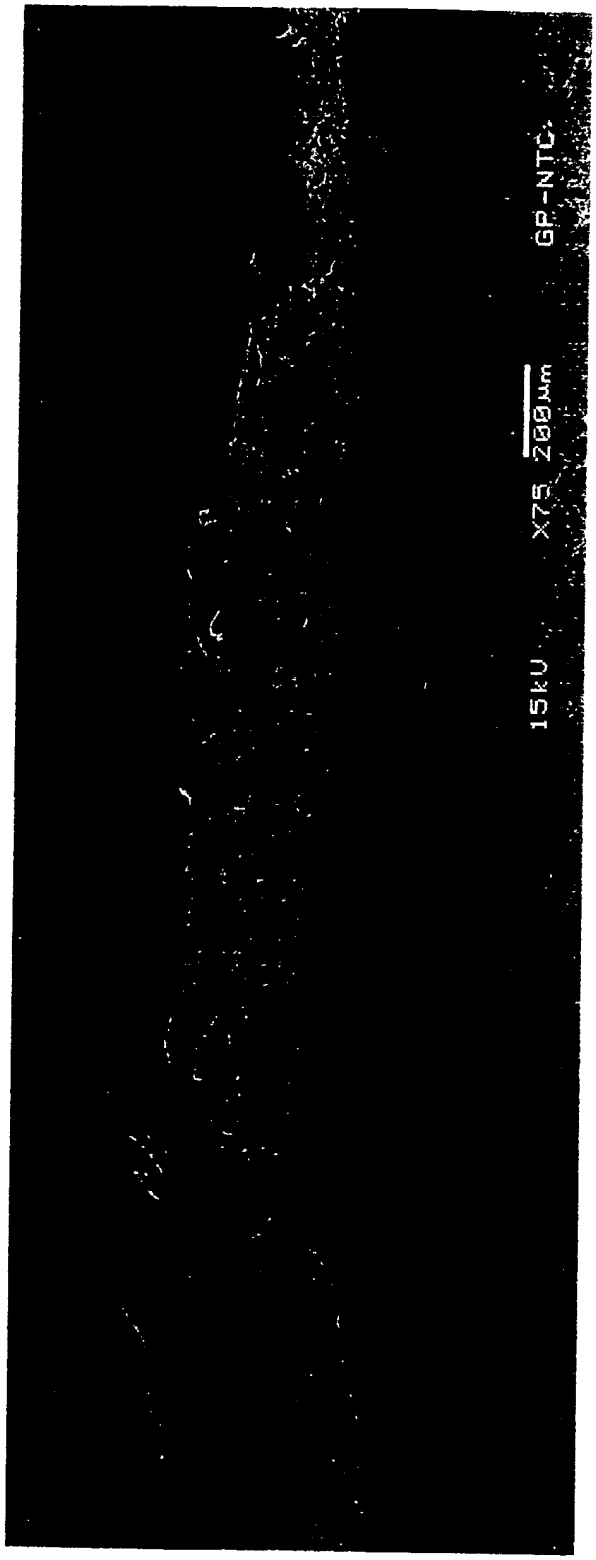


FIG. 17

FIG. 18

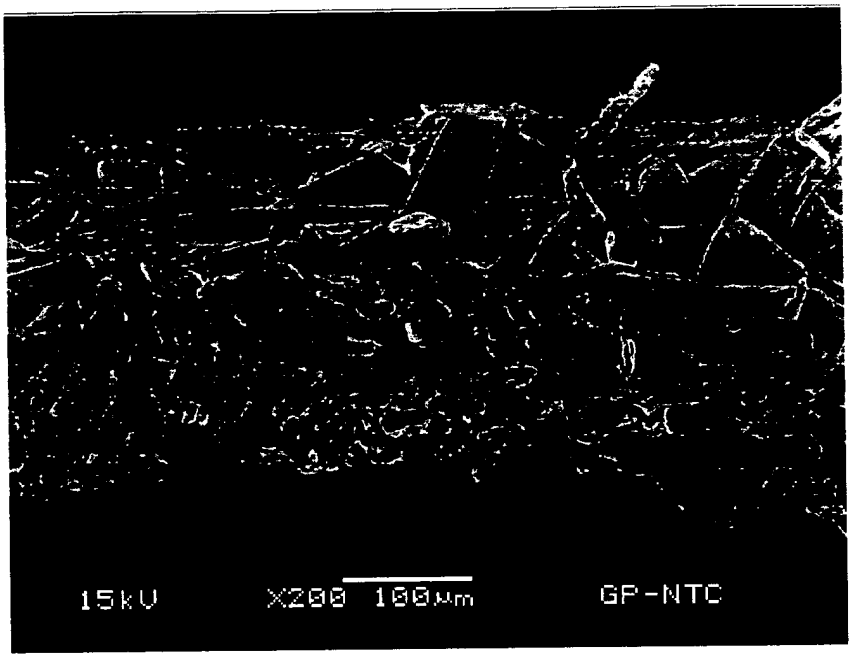


FIG. 19

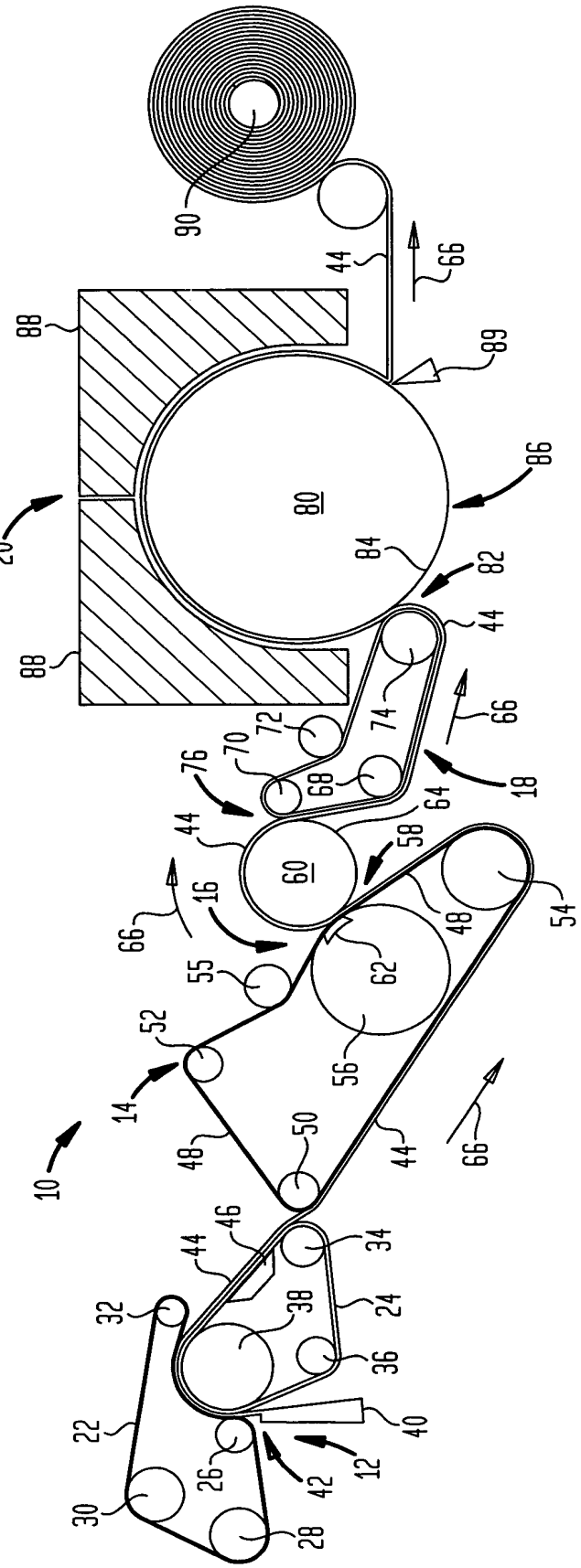

90
44
66
88
89
86
80
20
84
82
88
44
74
66
72
70
76
68
64
18
44
58
60
16
66
48
54
55
62
52
56
14
48
50
44
66
10
46
34
44
32
38
24
36
22
40
26
42
12
30
28

FIG. 20

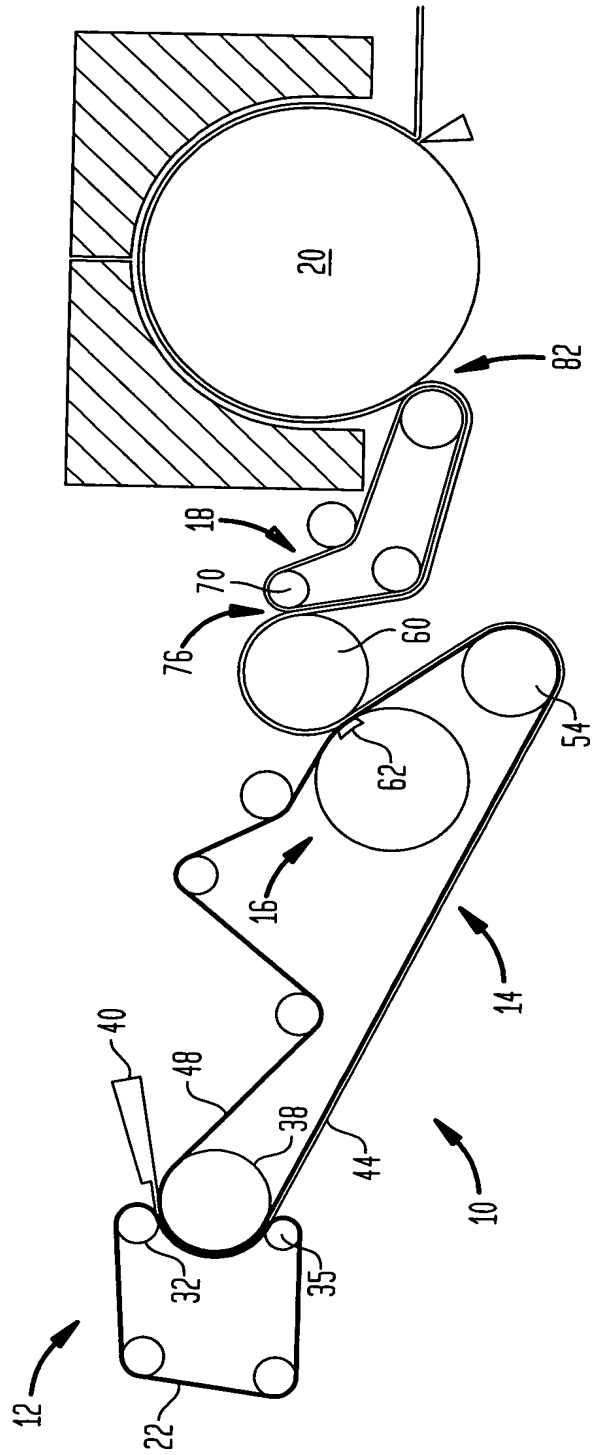


FIG. 21

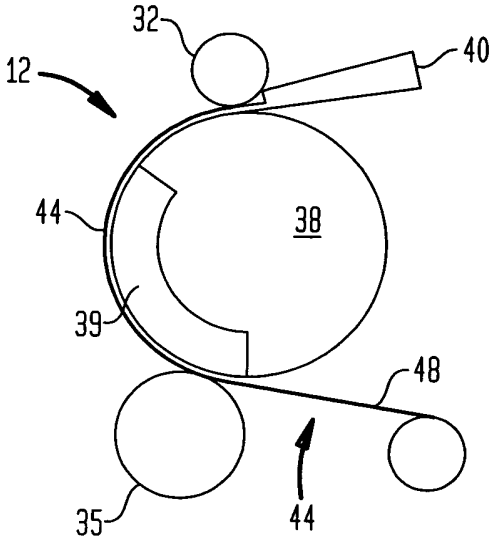


FIG. 22

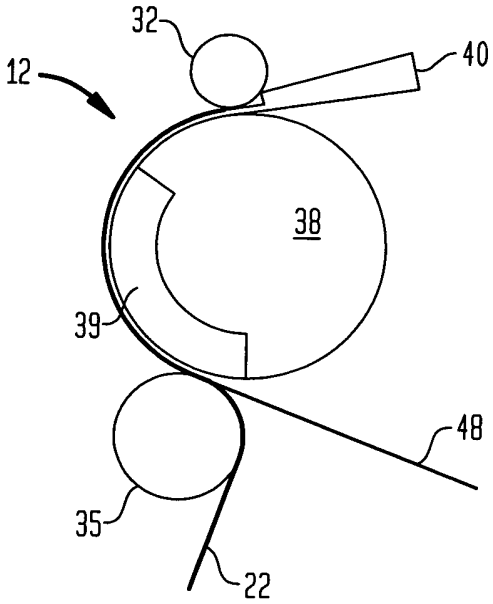


FIG. 23

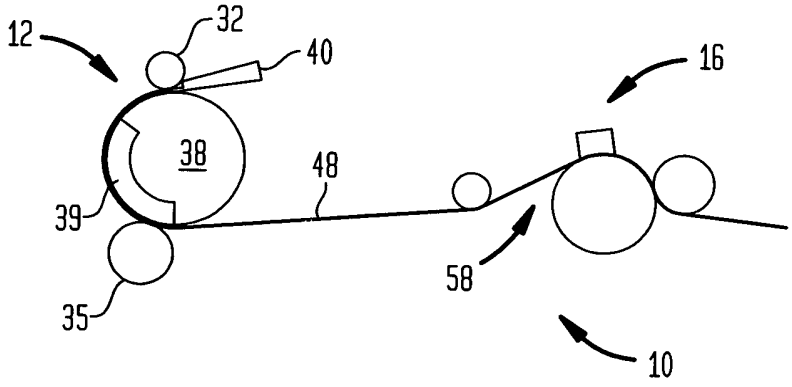


FIG. 24

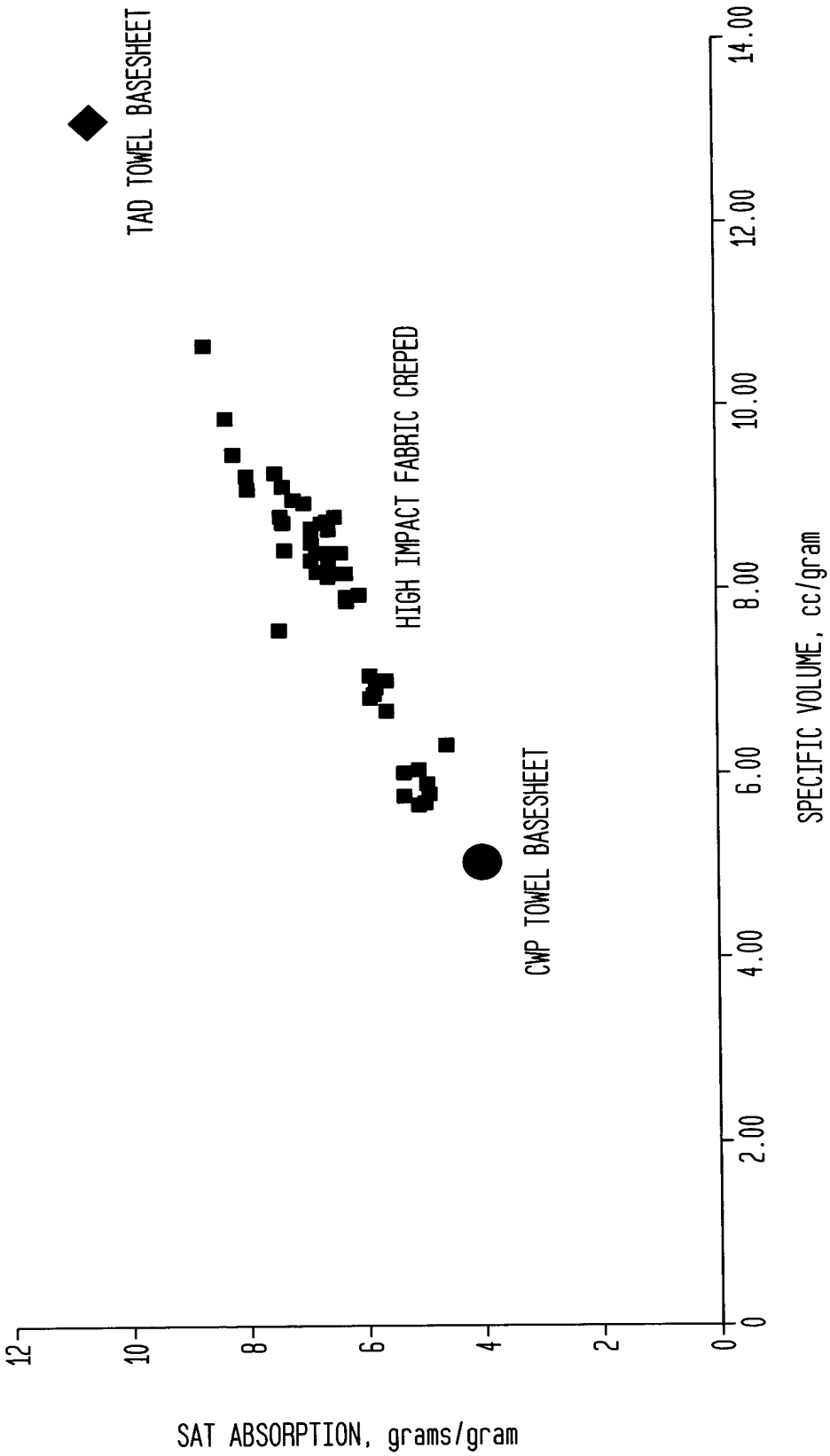

TAD TOWEL BASESHEET
HIGH IMPACT FABRIC CREPED
CWP TOWEL BASESHEET
SAT ABSORPTION, grams/gram
SPECIFIC VOLUME, cc/gram
0
2
4
6
8
10
12
0
2.00
4.00
6.00
8.00
10.00
12.00
14.00

FIG. 25

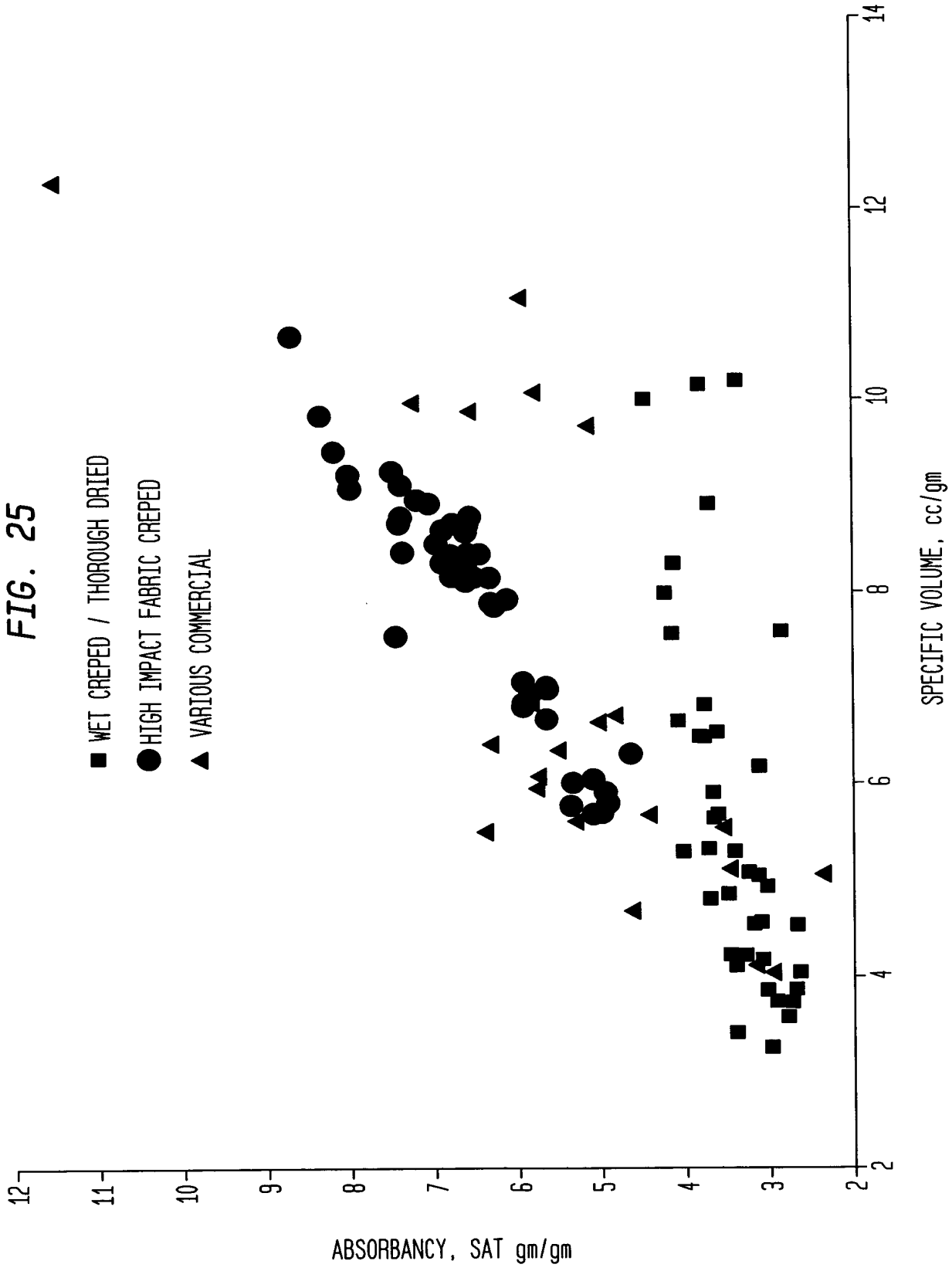

■ WET CREPED / THOROUGH DRIED
● HIGH IMPACT FABRIC CREPED
▲ VARIOUS COMMERCIAL
ABSORBANCY, SAT gm/gm
SPECIFIC VOLUME, cc/gm
12
11
10
9
8
7
6
5
4
3
2
2
4
6
8
10
12
14

FIG. 26

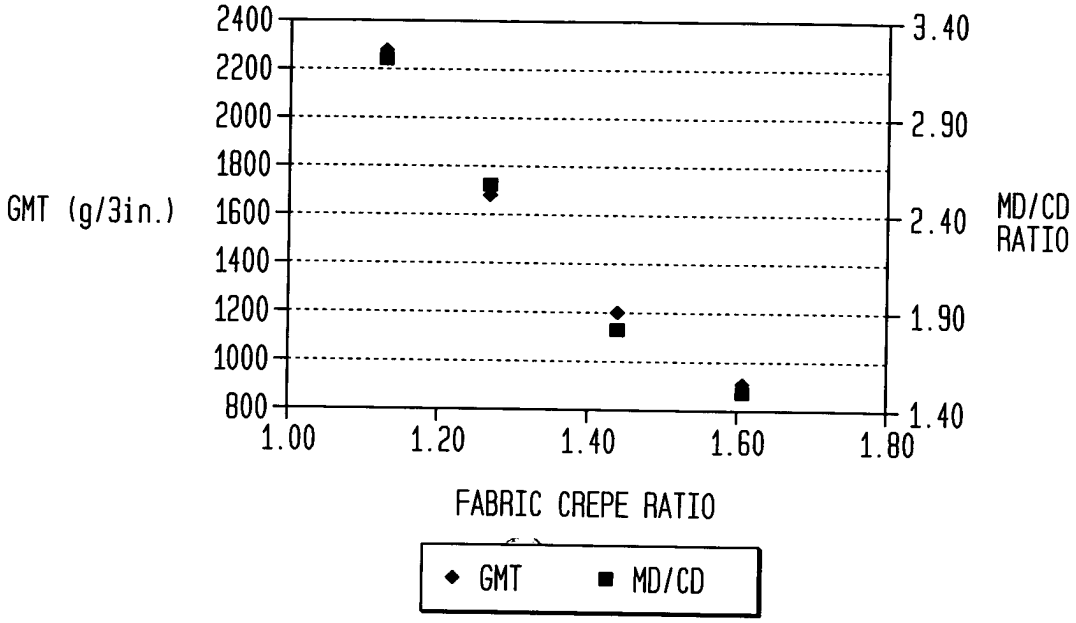

2400
2200
2000
1800
1600
1400
1200
1000
800
GMT (g/3in.)
3.40
2.90
2.40
1.90
1.40
MD/CD RATIO
1.00
1.20
1.40
1.60
1.80
FABRIC CREPE RATIO
GMT
MD/CD

FIG. 27

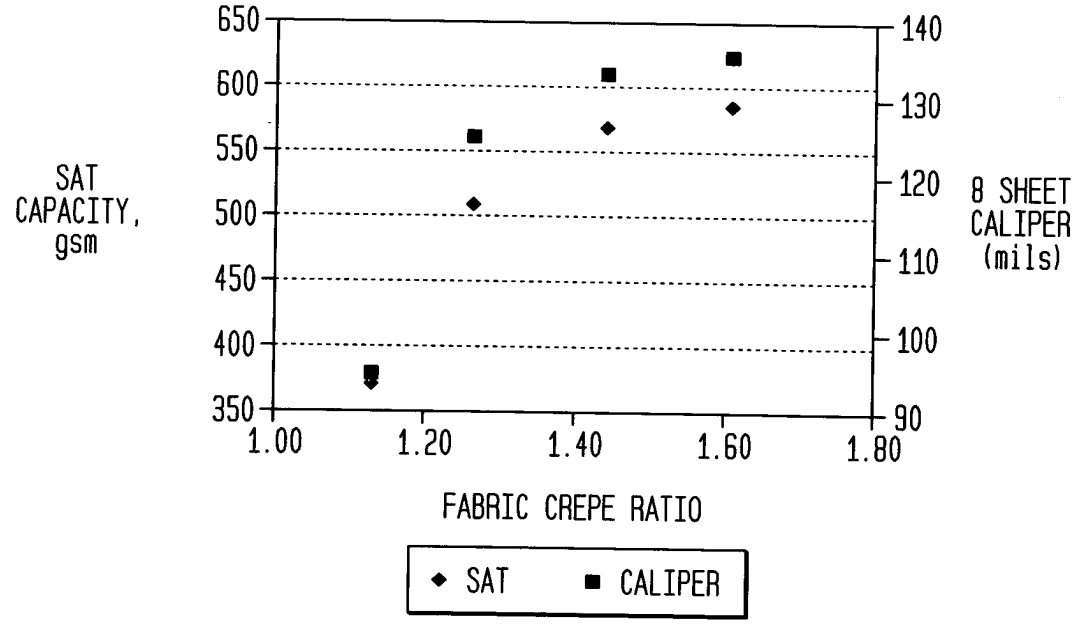

650
600
550
500
450
400
350
SAT CAPACITY, gsm
140
130
120
110
100
90
8 SHEET CALIPER (mils)
1.00
1.20
1.40
1.60
1.80
FABRIC CREPE RATIO
SAT
CALIPER

FIG. 28

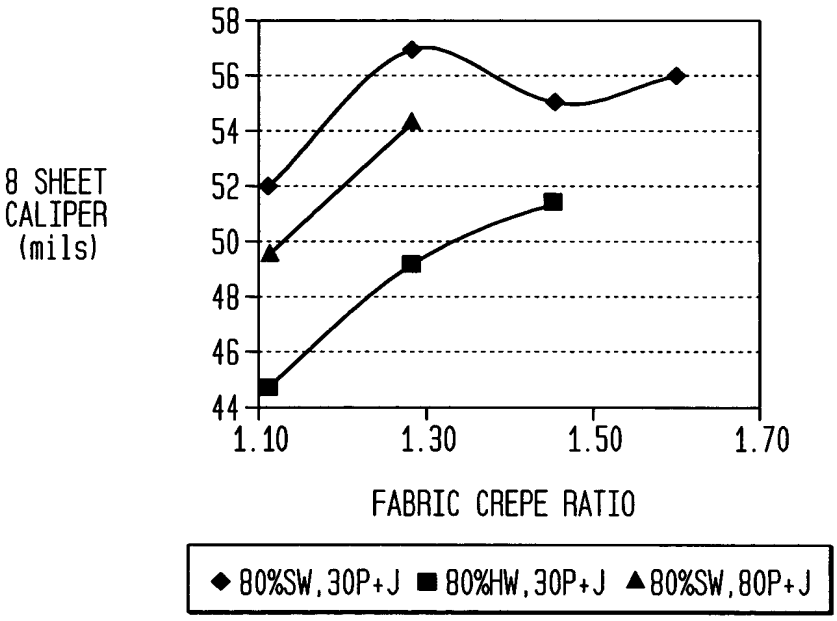

8 SHEET
CALIPER
(mils)
58
56
54
52
50
48
46
44
1.10
1.30
1.50
1.70
FABRIC CREPE RATIO
◆ 80%SW, 30P+J ■ 80%HW, 30P+J ▲ 80%SW, 80P+J

FIG. 29

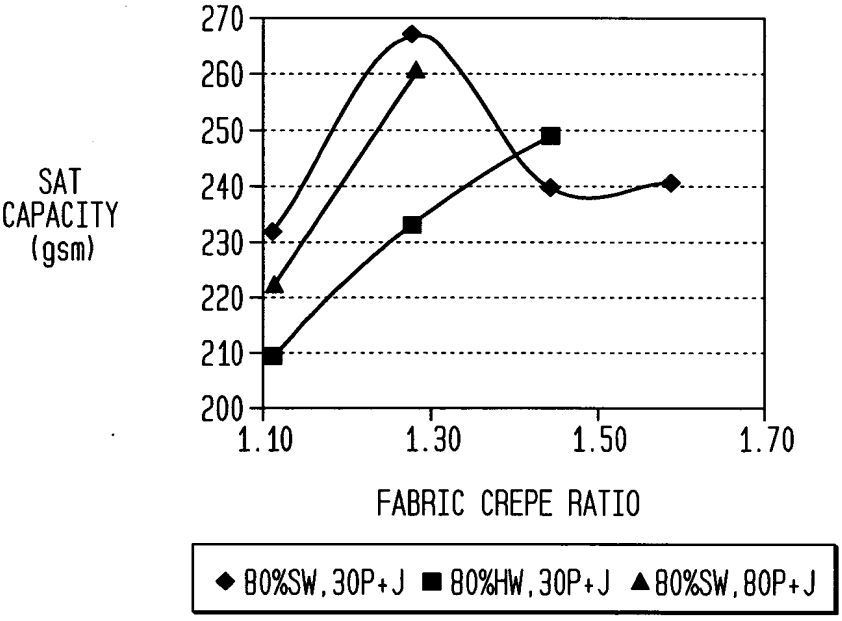

SAT
CAPACITY
(gsm)
270
260
250
240
230
220
210
200
1.10
1.30
1.50
1.70
FABRIC CREPE RATIO
◆ 80%SW, 30P+J ■ 80%HW, 30P+J ▲ 80%SW, 80P+J

FIG. 30

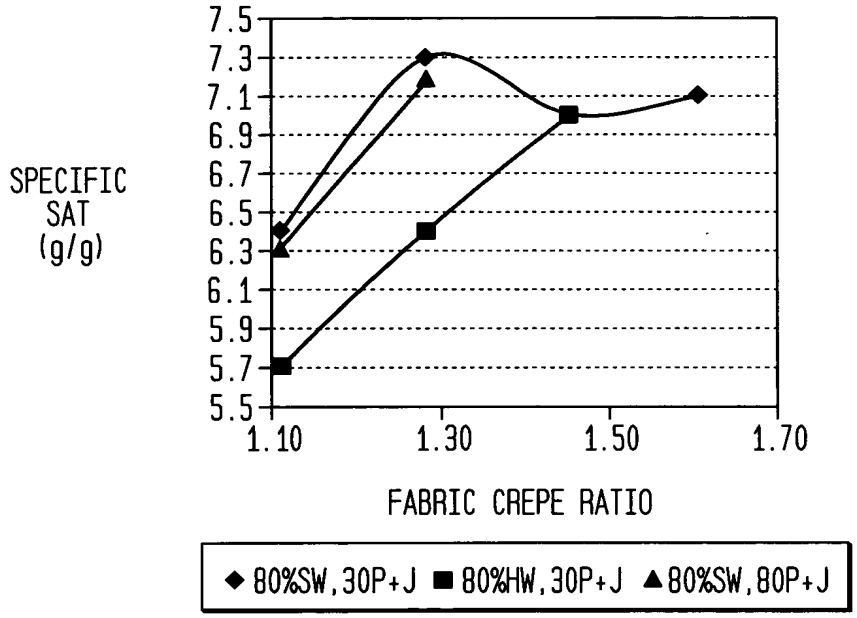

SPECIFIC SAT (g/g)
7.5
7.3
7.1
6.9
6.7
6.5
6.3
6.1
5.9
5.7
5.5
1.10
1.30
1.50
1.70
FABRIC CREPE RATIO
◆ 80%SW,30P+J ■ 80%HW,30P+J ▲ 80%SW,80P+J

FIG. 31

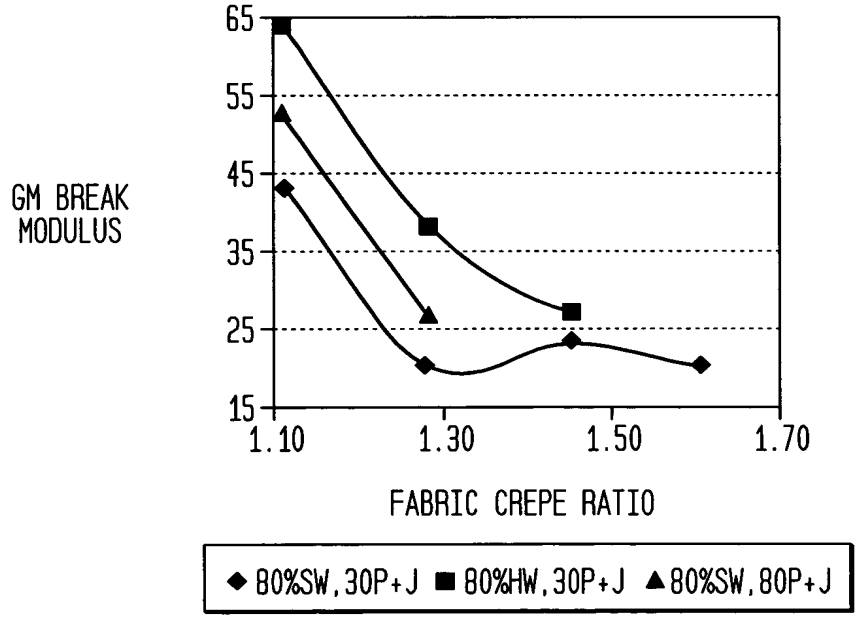
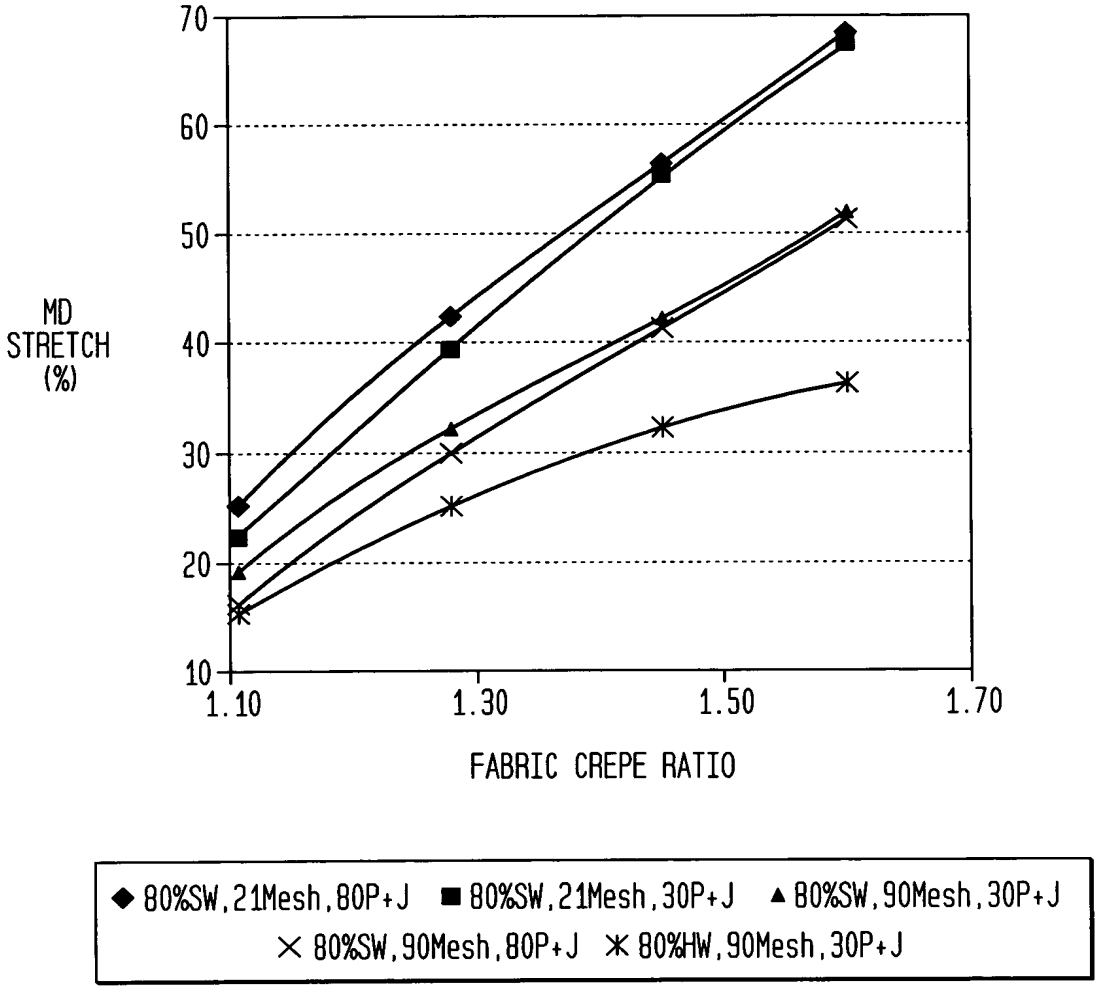

GM BREAK MODULUS
65
55
45
35
25
15
1.10
1.30
1.50
1.70
FABRIC CREPE RATIO
◆ 80%SW,30P+J ■ 80%HW,30P+J ▲ 80%SW,80P+J

FIG. 32


70
60
50
40
30
20
10
MD
STRETCH
(%)
1.10
1.30
1.50
1.70
FABRIC CREPE RATIO
◆ 80%SW,21Mesh,80P+J
■ 80%SW,21Mesh,30P+J
▲ 80%SW,90Mesh,30P+J
× 80%SW,90Mesh,80P+J
✳ 80%HW,90Mesh,30P+J

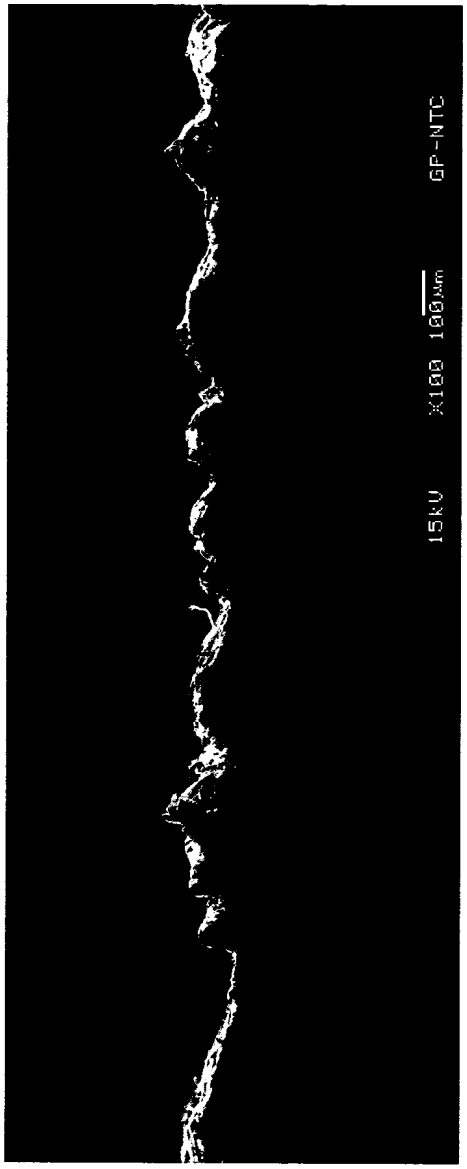


FIG. 33
(PRIOR ART)

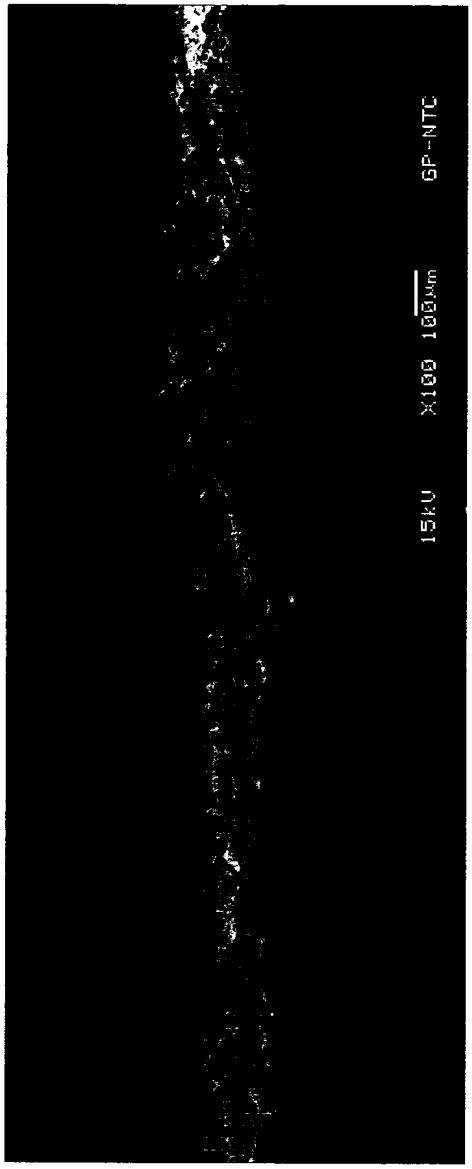


FIG. 34
(PRIOR ART)

FIG. 35
(PRIOR ART)

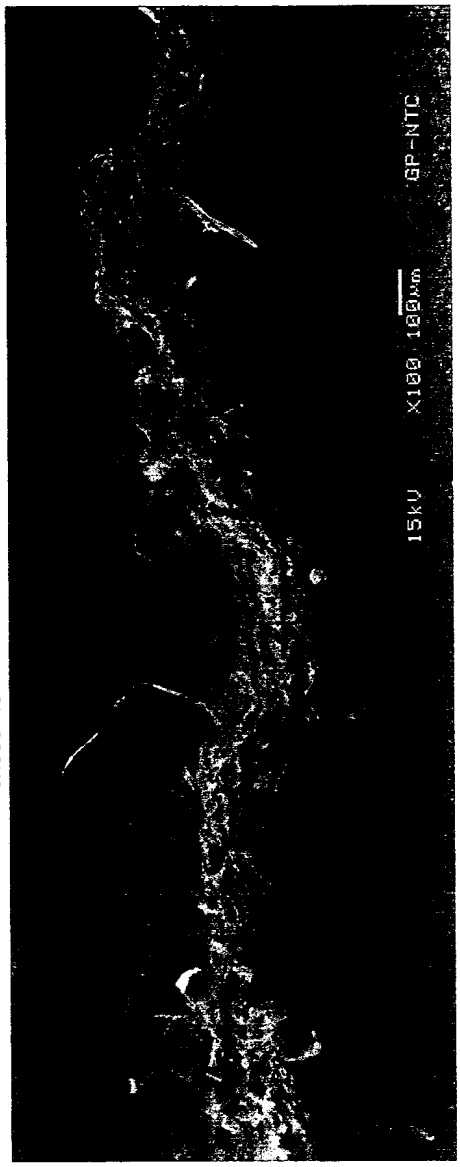
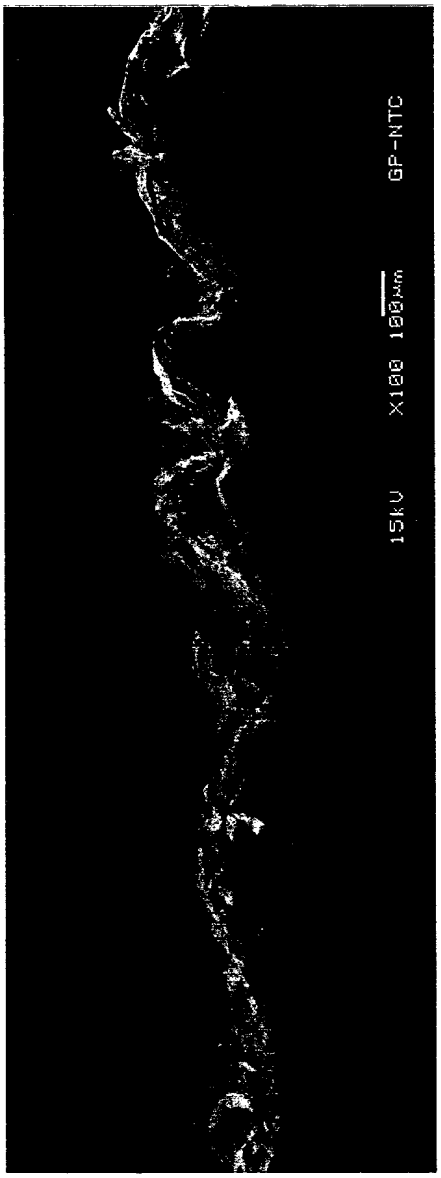


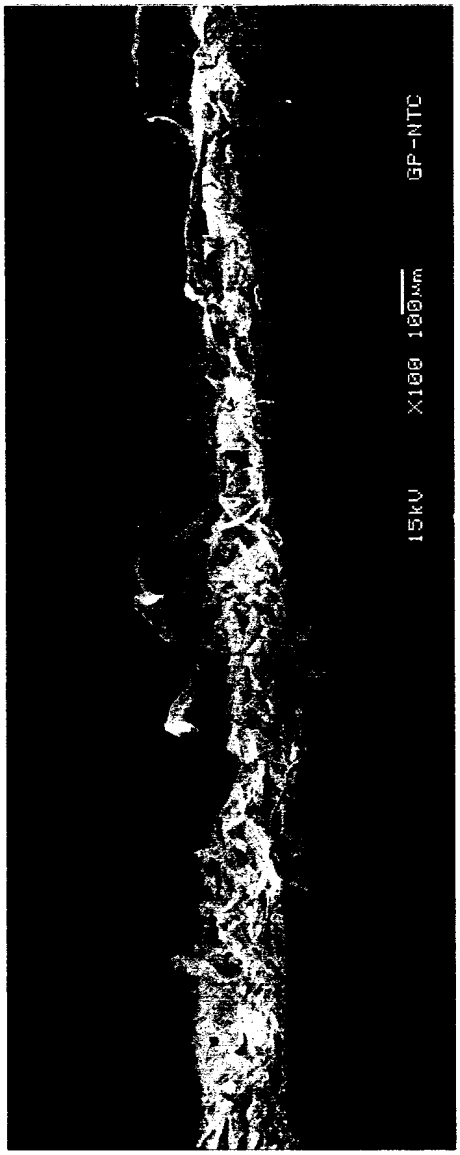
FIG. 36
(PRIOR ART)

FIG. 37
CROSS-SECTIONAL VIEW OF FABRIC-CREPED BASESHEET



DIRECTION A

FIG. 38
CROSS-SECTIONAL VIEW OF FABRIC-CREPED BASESHEET

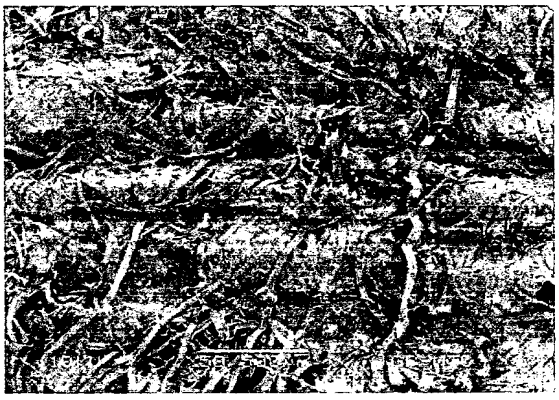


DIRECTION B

FIG. 39
(PRIOR ART)

TAD

FIG. 40



FABRIC CREPED

FIG. 41
(PRIOR ART)

CWP

FIG. 42

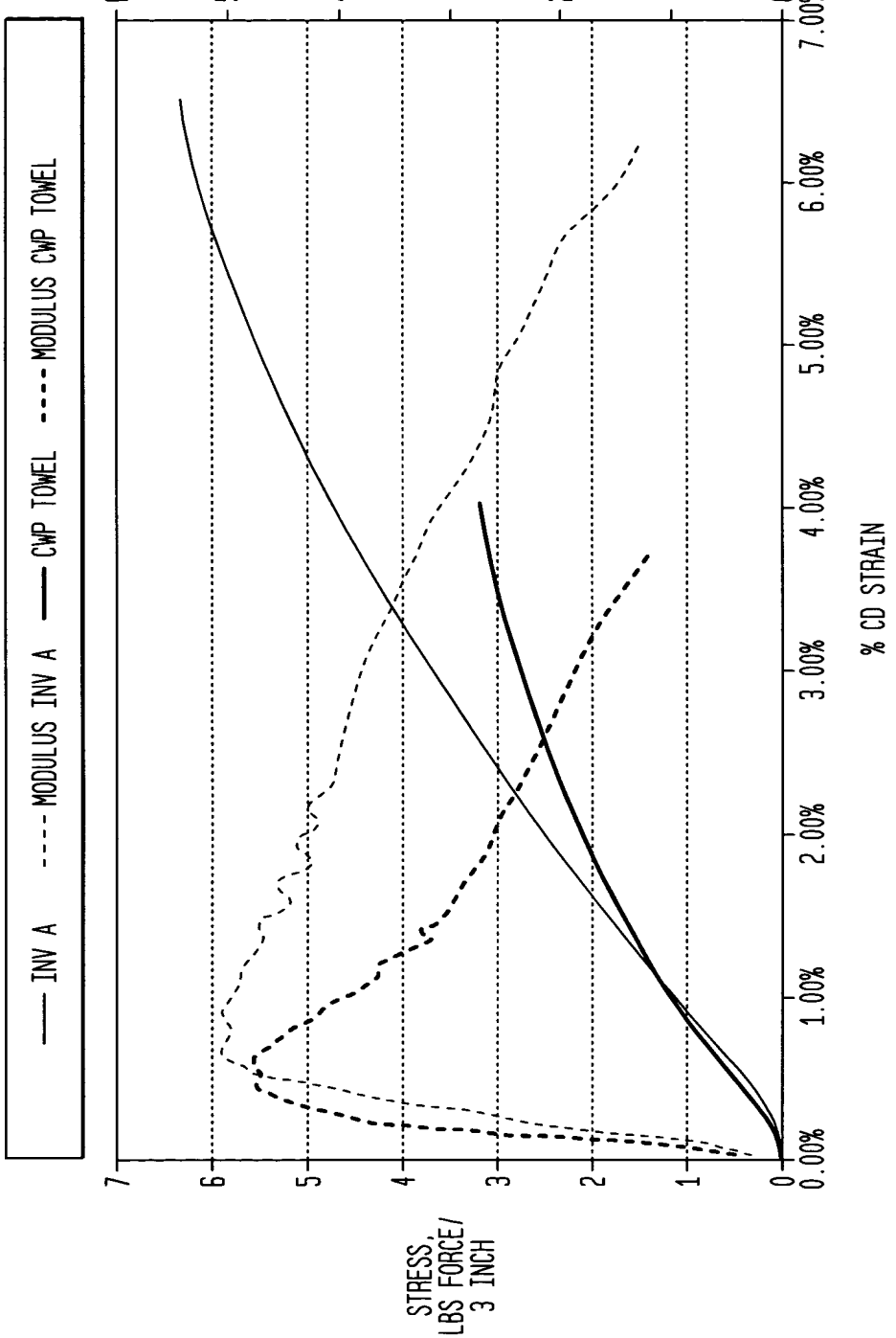

INV A
MODULUS INV A
CWP TOWEL
MODULUS CWP TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%

FIG. 43

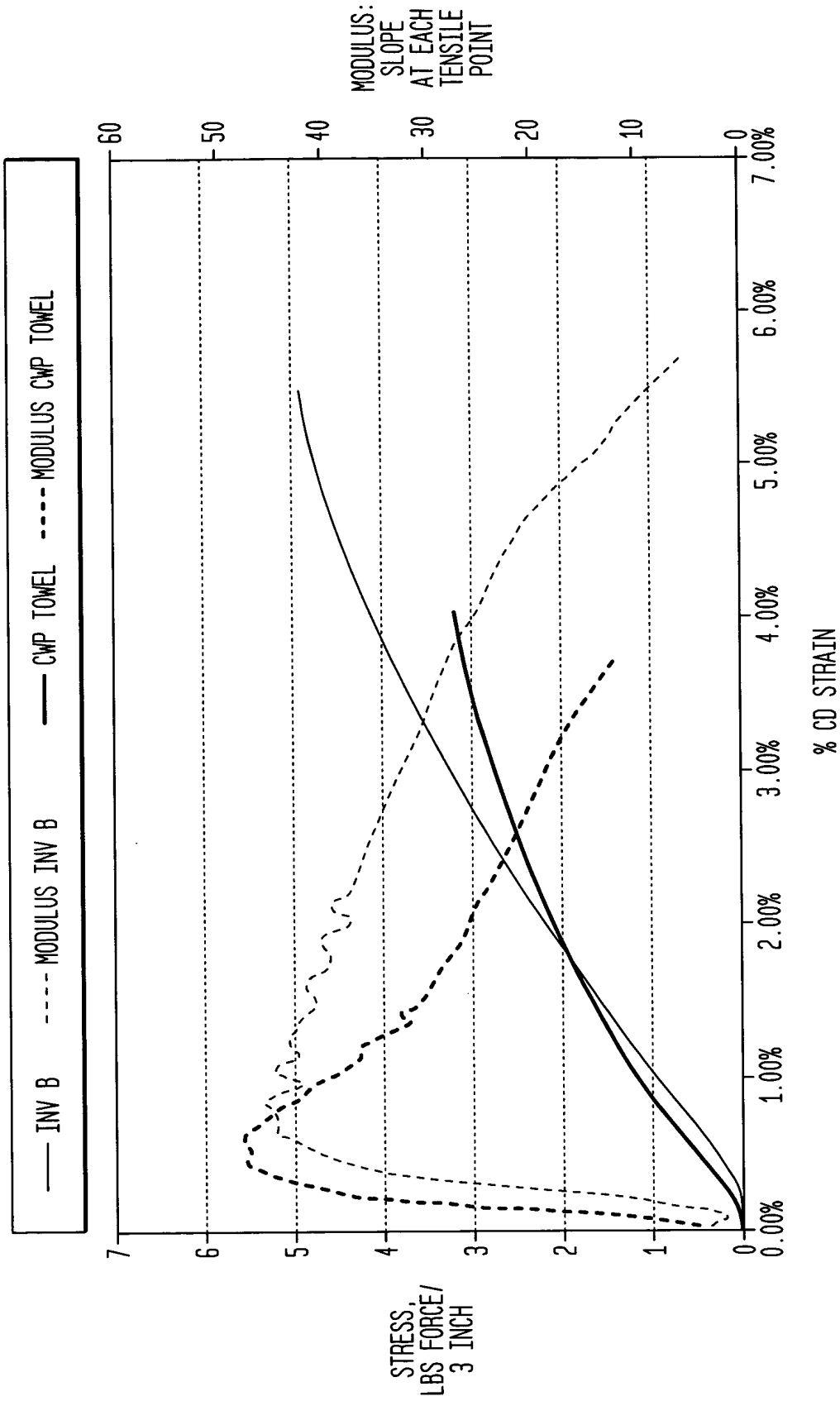

INV B
MODULUS INV B
CWP TOWEL
MODULUS CWP TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%

FIG. 44

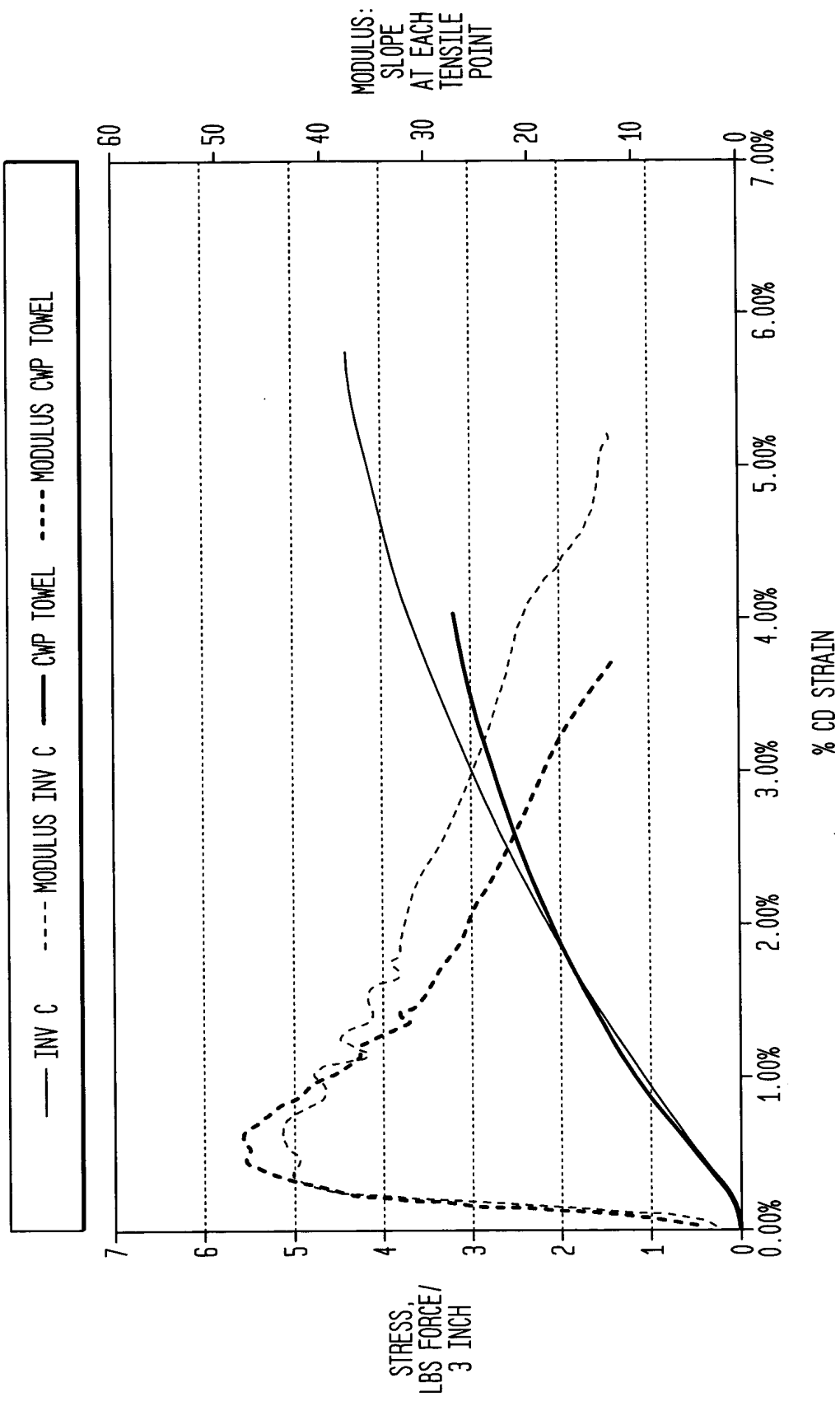

INV C
MODULUS INV C
CWP TOWEL
MODULUS CWP TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%

FIG. 45

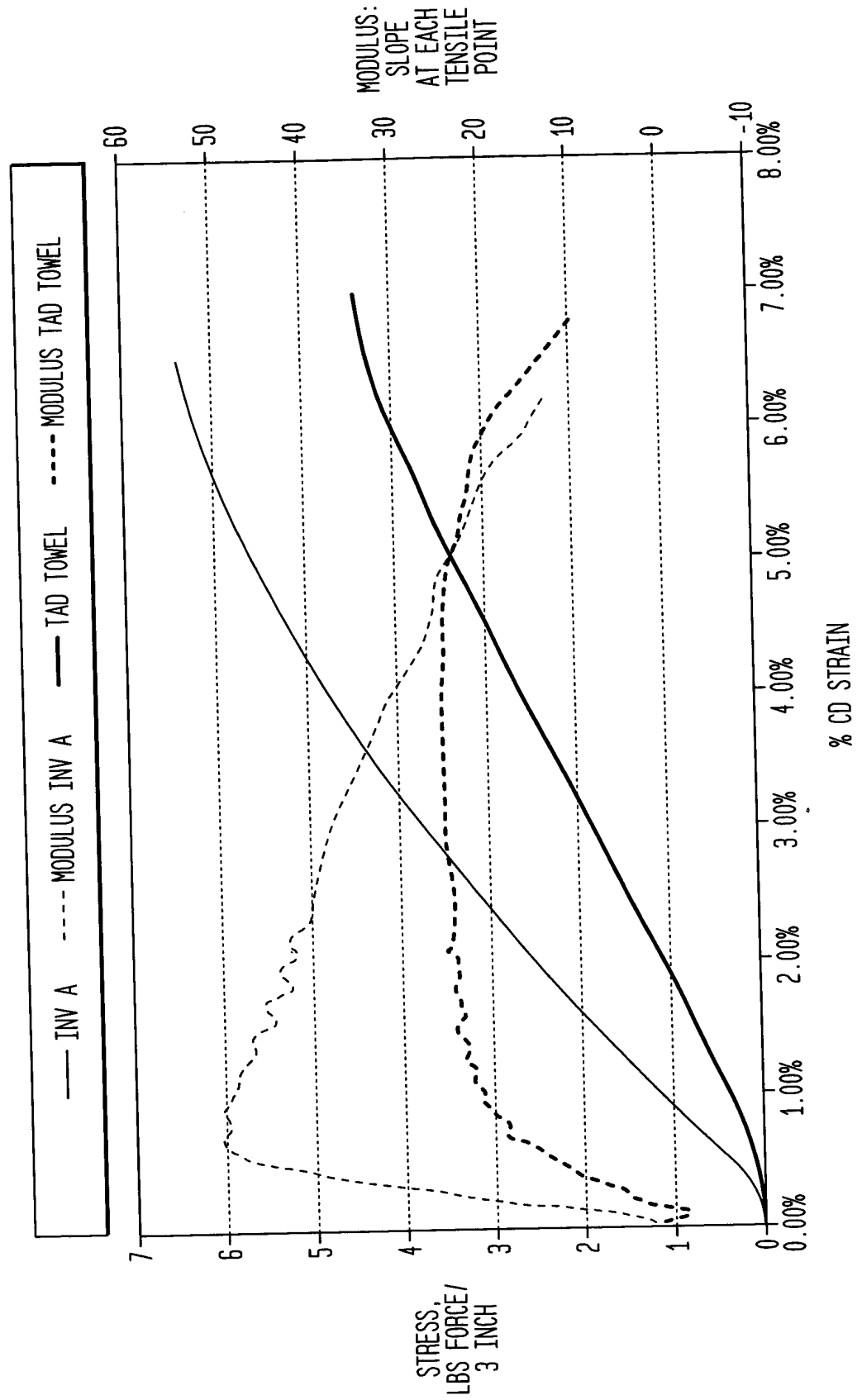

INV A
MODULUS INV A
TAD TOWEL
MODULUS TAD TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
-10
0
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%
8.00%

FIG. 46

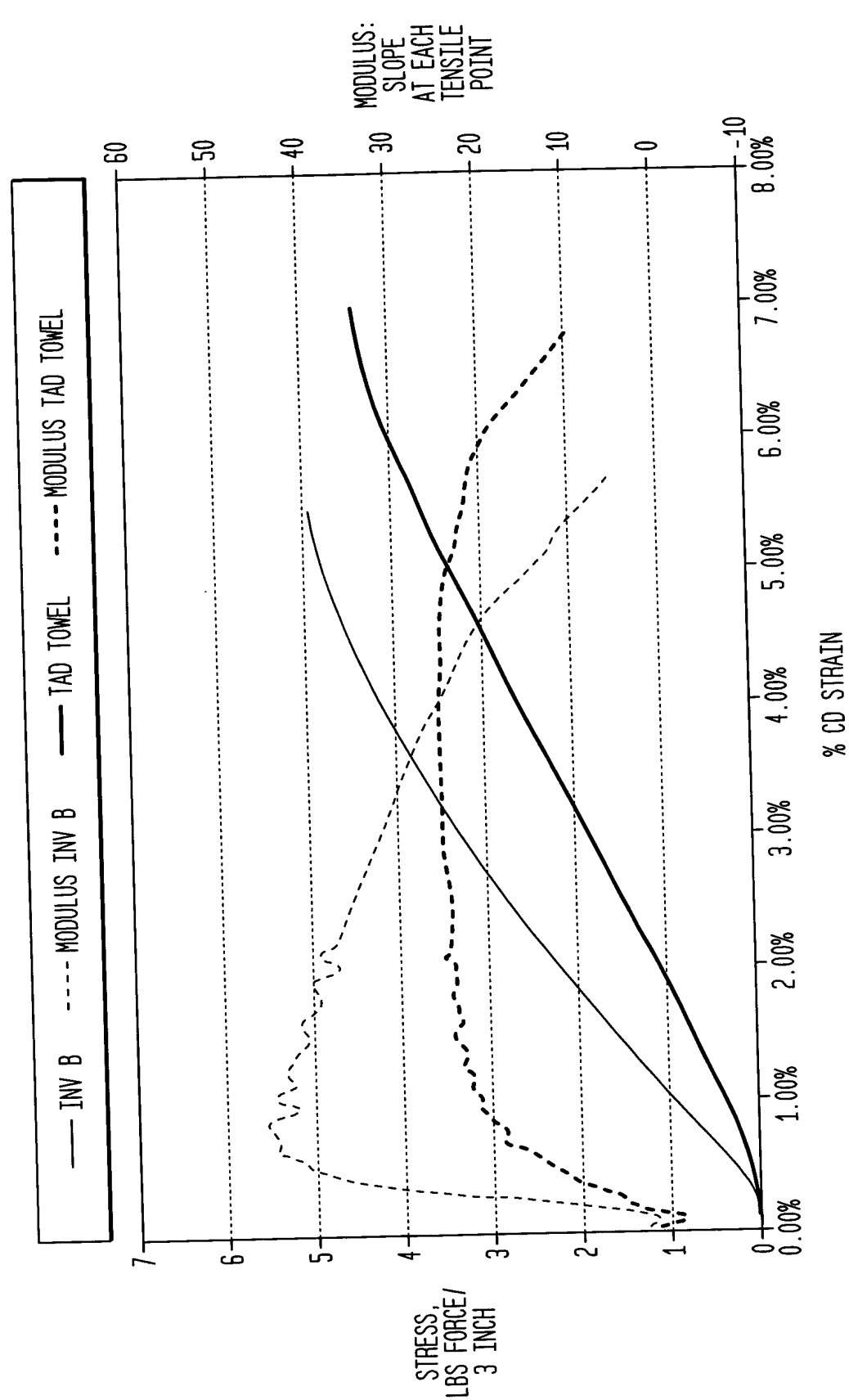

INV B
MODULUS INV B
TAD TOWEL
MODULUS TAD TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
-10
0
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%
8.00%

FIG. 47

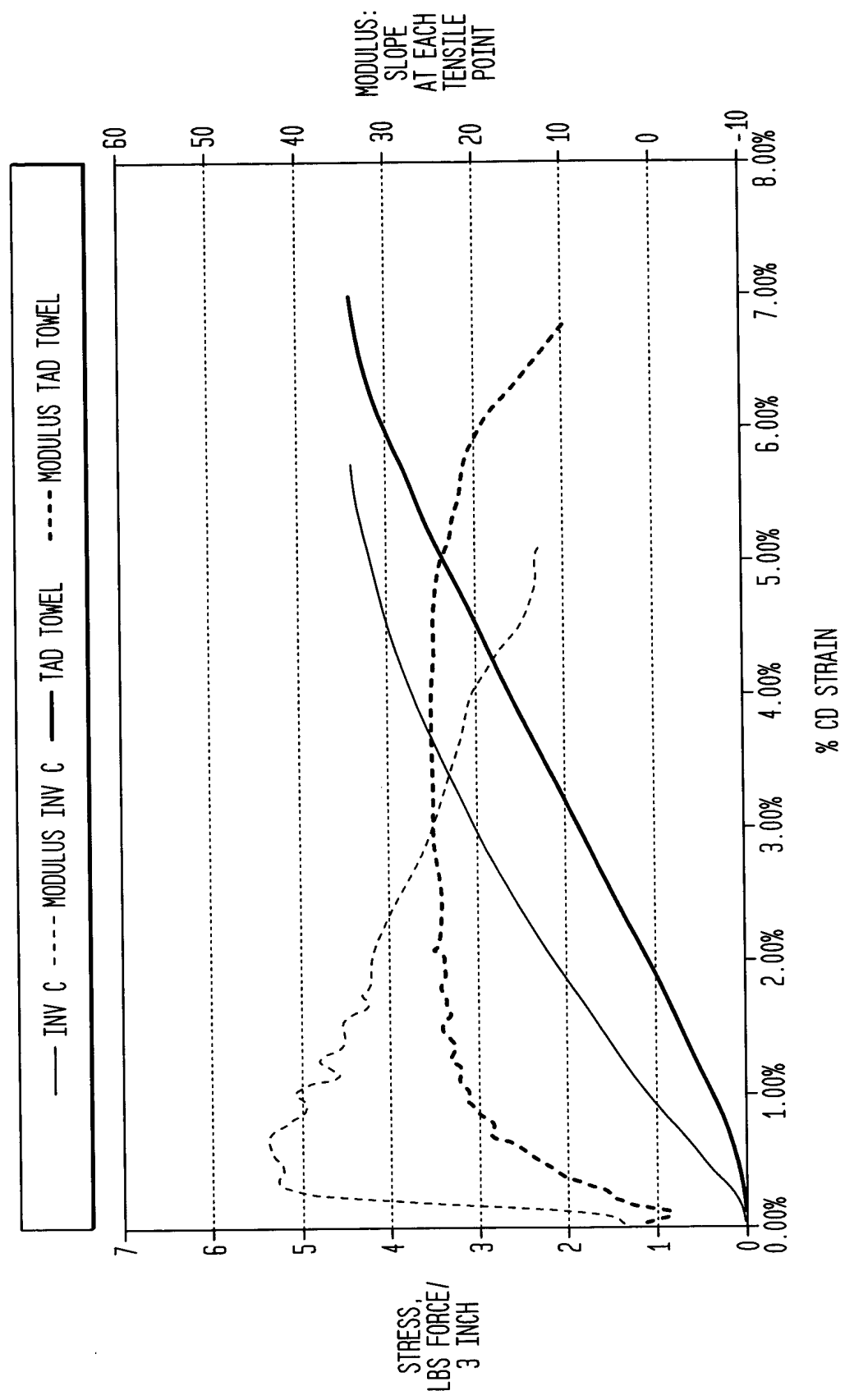

INV C
MODULUS INV C
TAD TOWEL
MODULUS TAD TOWEL
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% CD STRAIN
0
1
2
3
4
5
6
7
-10
0
10
20
30
40
50
60
0.00%
1.00%
2.00%
3.00%
4.00%
5.00%
6.00%
7.00%
8.00%

FIG. 48

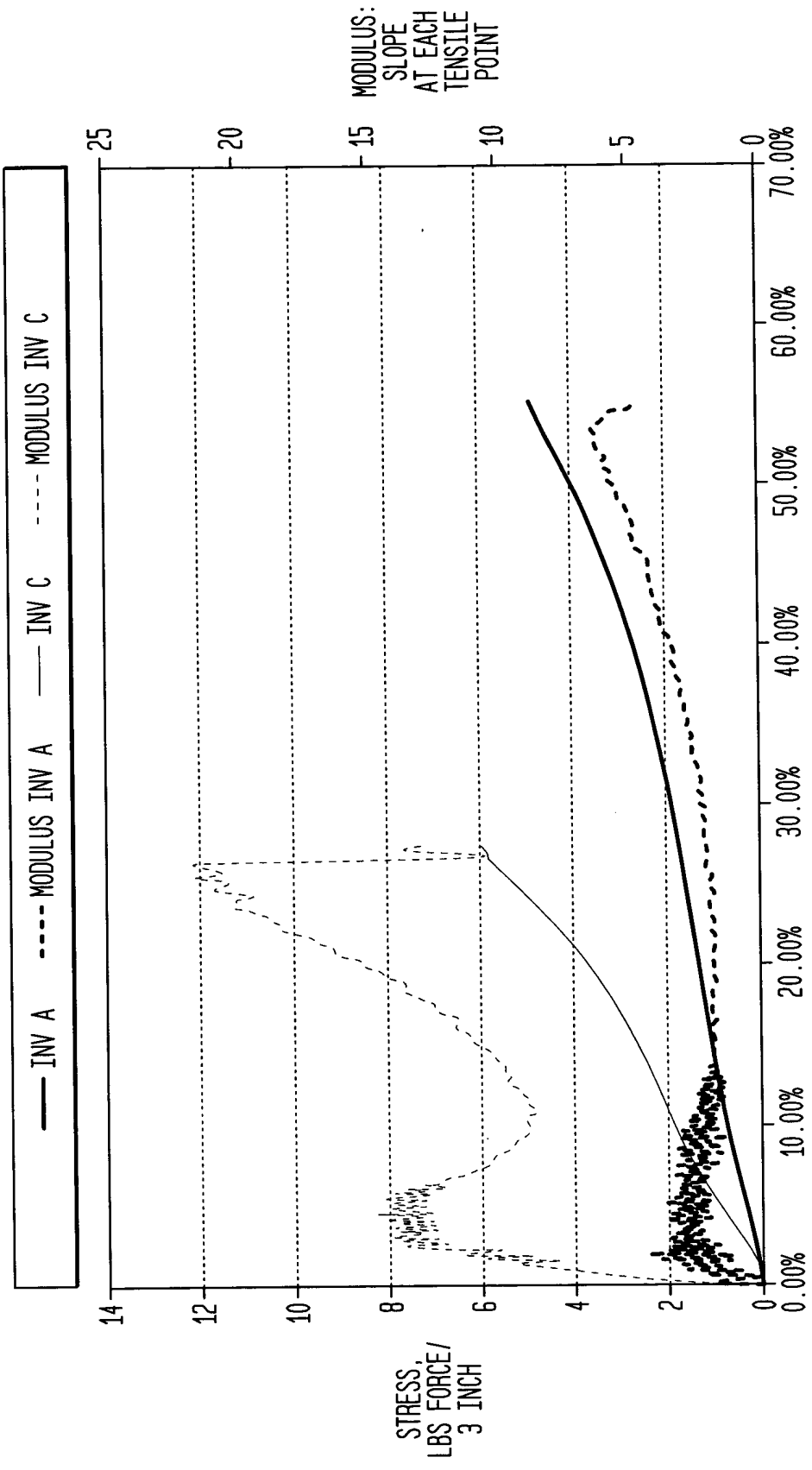

INV A
MODULUS INV A
INV C
MODULUS INV C
MODULUS: SLOPE AT EACH TENSILE POINT
STRESS, LBS FORCE/ 3 INCH
% STRAIN
0
2
4
6
8
10
12
14
0
5
10
15
20
25
0.00%
10.00%
20.00%
30.00%
40.00%
50.00%
60.00%
70.00%

FIG. 49

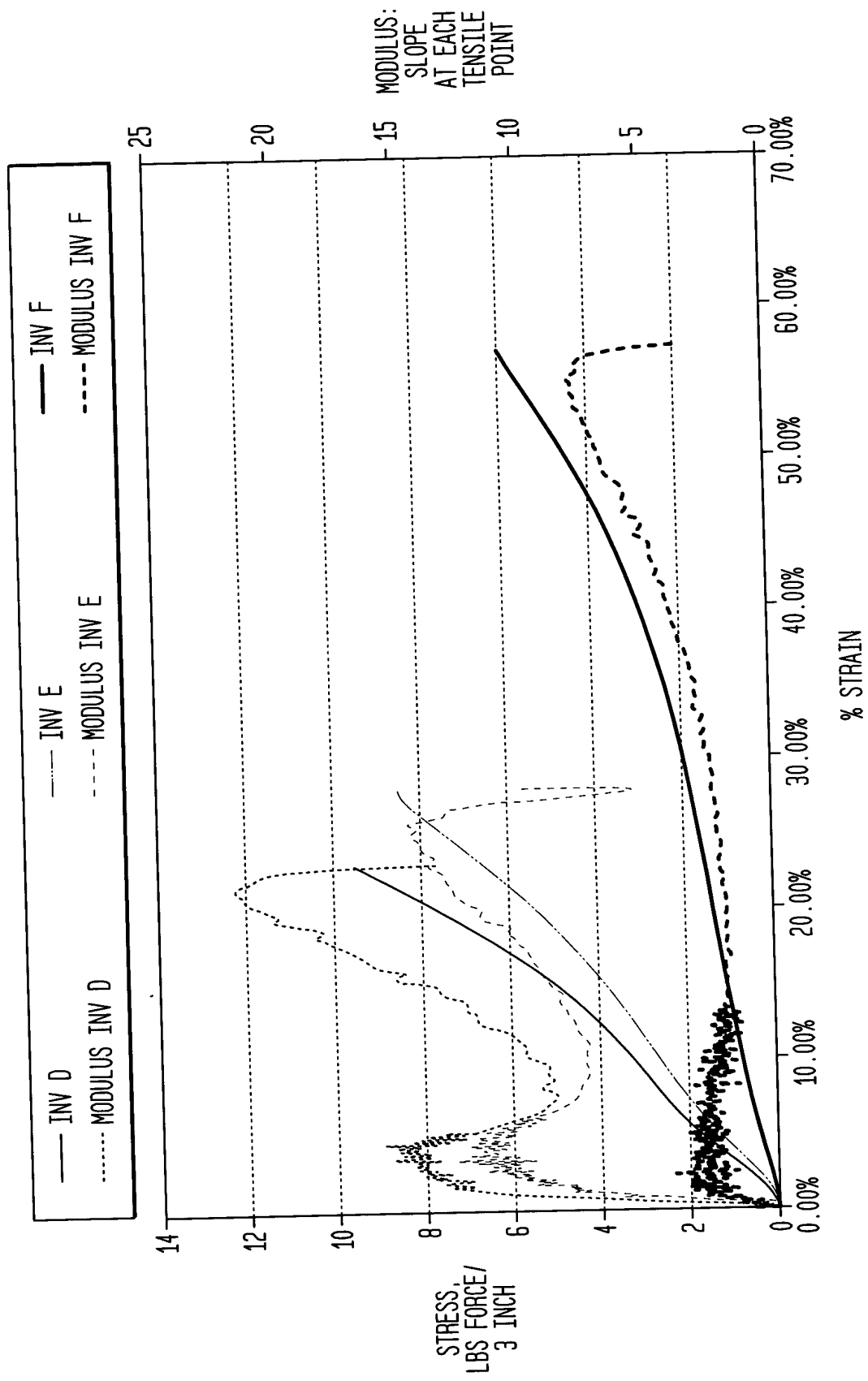

INV D
MODULUS INV D
INV E
MODULUS INV E
INV F
MODULUS INV F
STRESS, LBS FORCE/ 3 INCH
MODULUS: SLOPE AT EACH TENSILE POINT
% STRAIN
0
2
4
6
8
10
12
14
0
5
10
15
20
25
0.00%
10.00%
20.00%
30.00%
40.00%
50.00%
60.00%
70.00%

FIG. 50

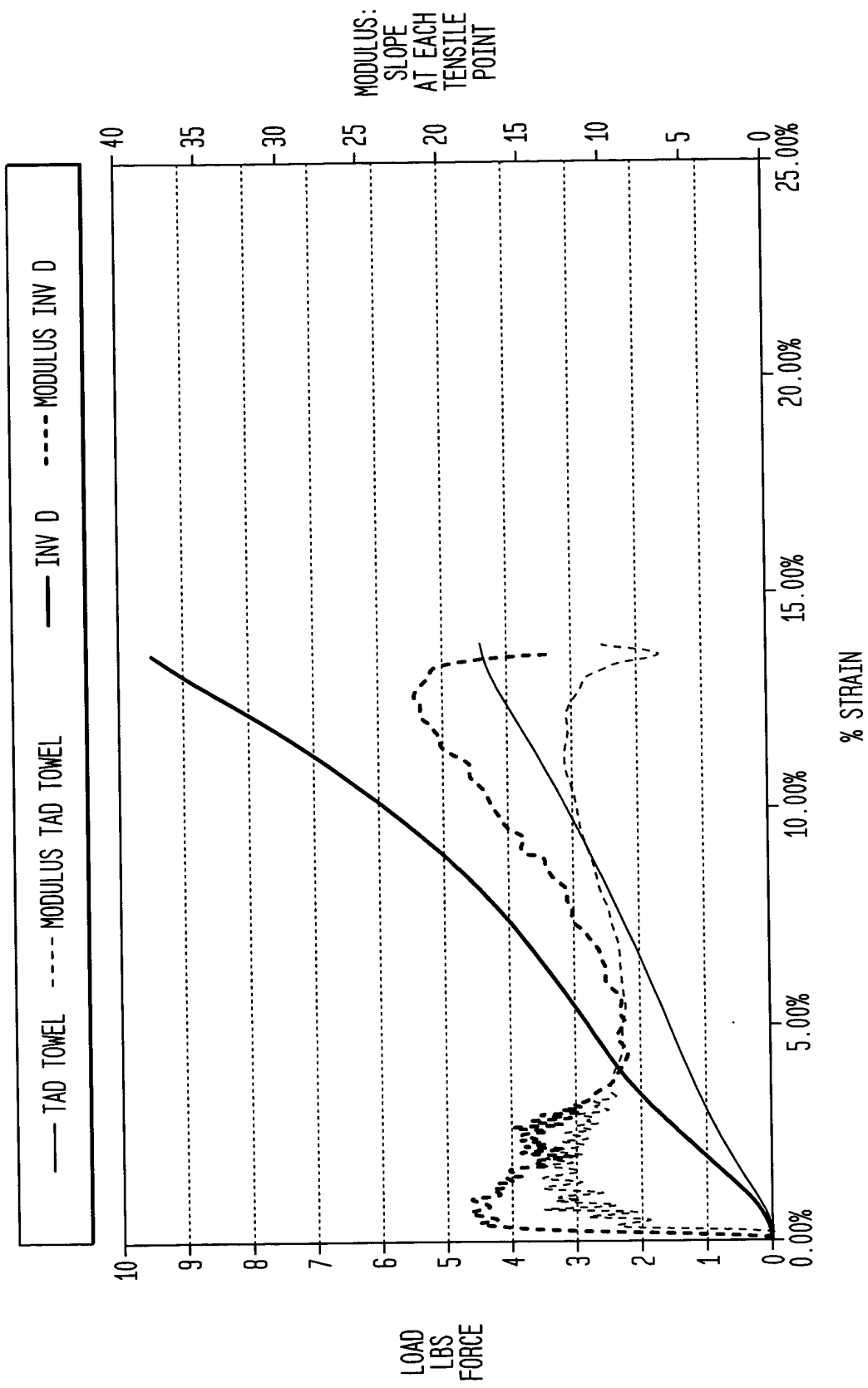

TAD TOWEL
MODULUS TAD TOWEL
INV D
MODULUS INV D
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% STRAIN
0.00%
5.00%
10.00%
15.00%
20.00%
25.00%

FIG. 51

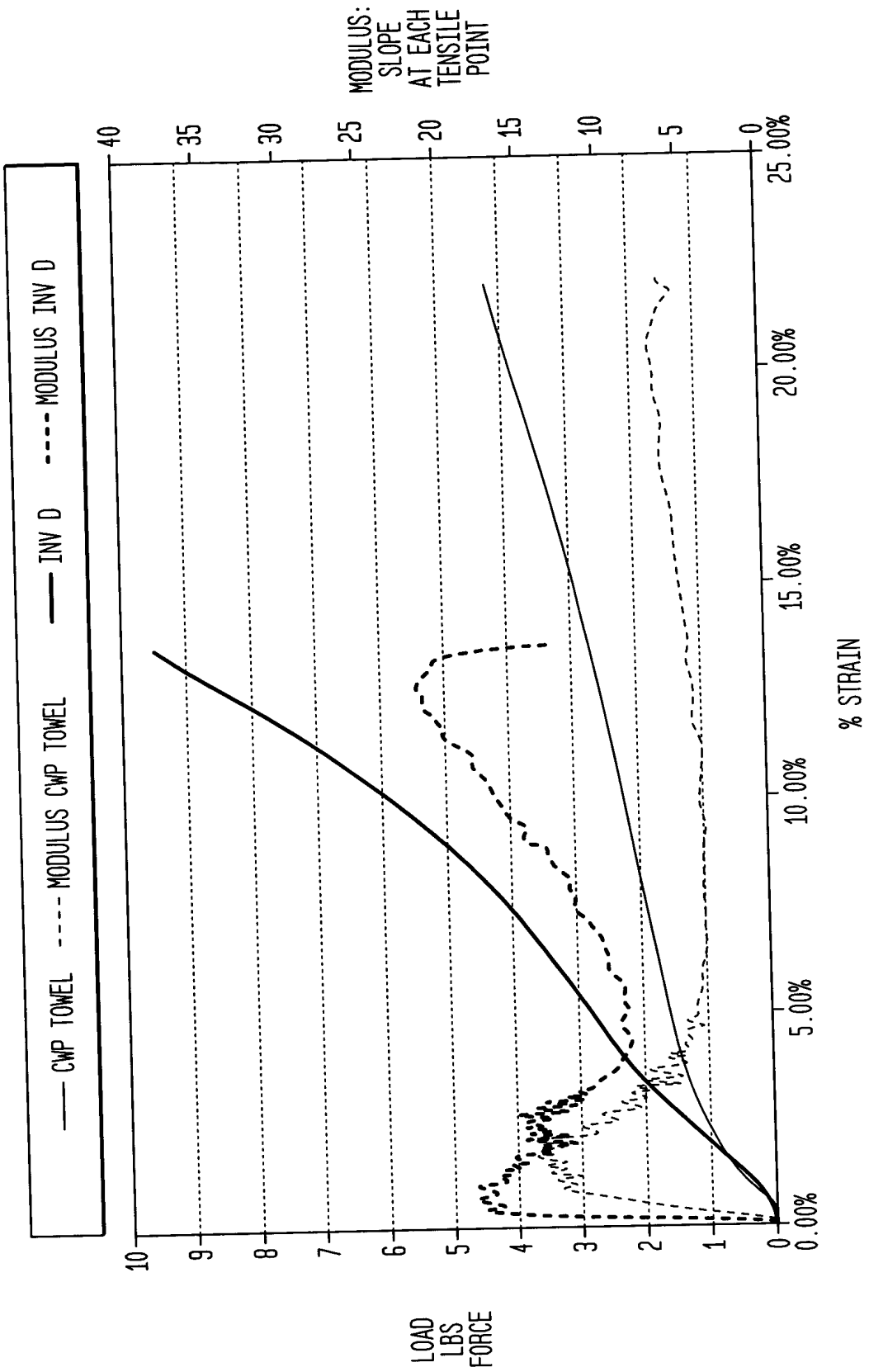

CWP TOWEL
MODULUS CWP TOWEL
INV D
MODULUS INV D
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% STRAIN
0.00%
5.00%
10.00%
15.00%
20.00%
25.00%

FIG. 52

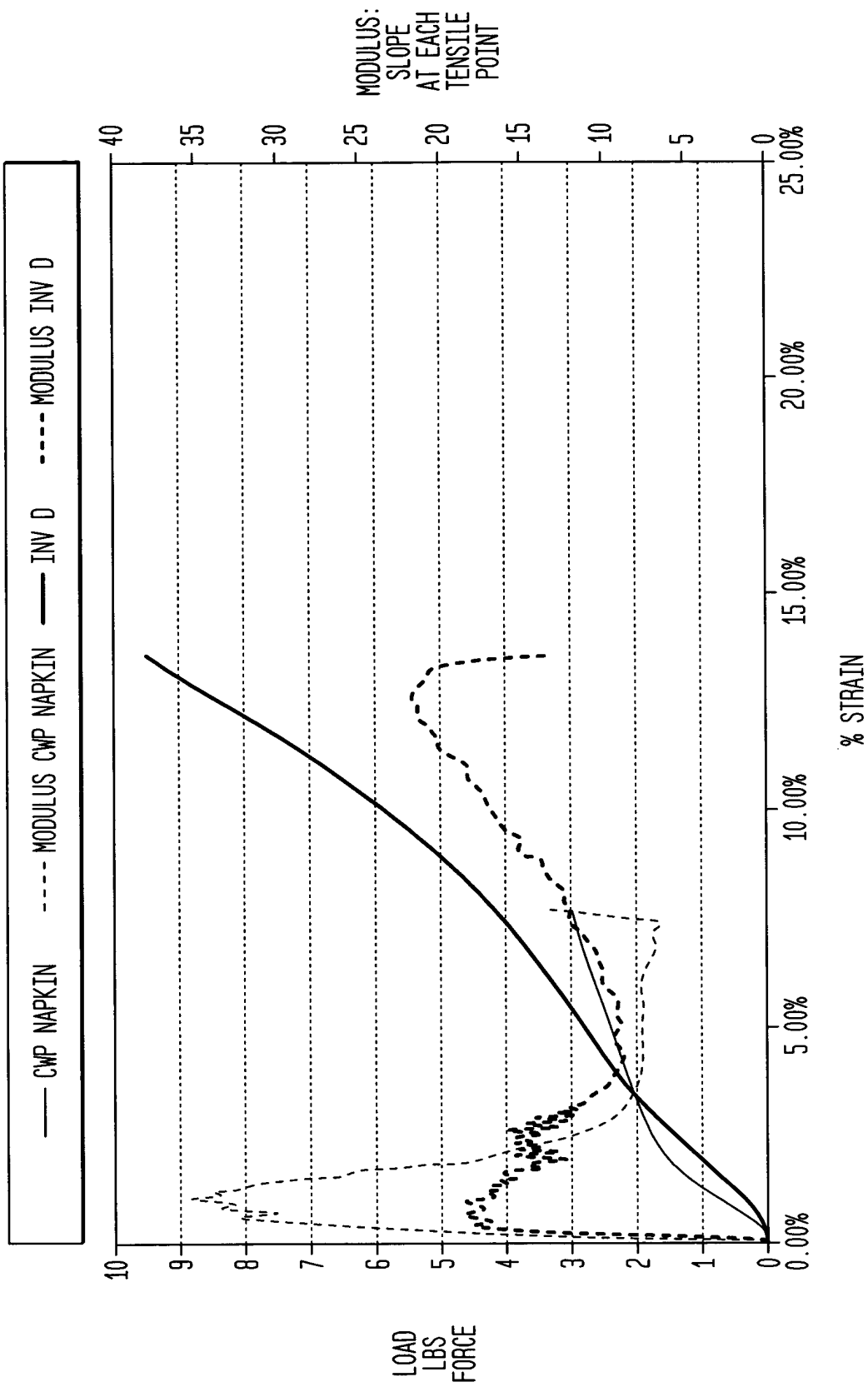

CWP NAPKIN
MODULUS CWP NAPKIN
INV D
MODULUS INV D
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% STRAIN
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15
20
25
30
35
40
0.00%
5.00%
10.00%
15.00%
20.00%
25.00%

FIG. 53

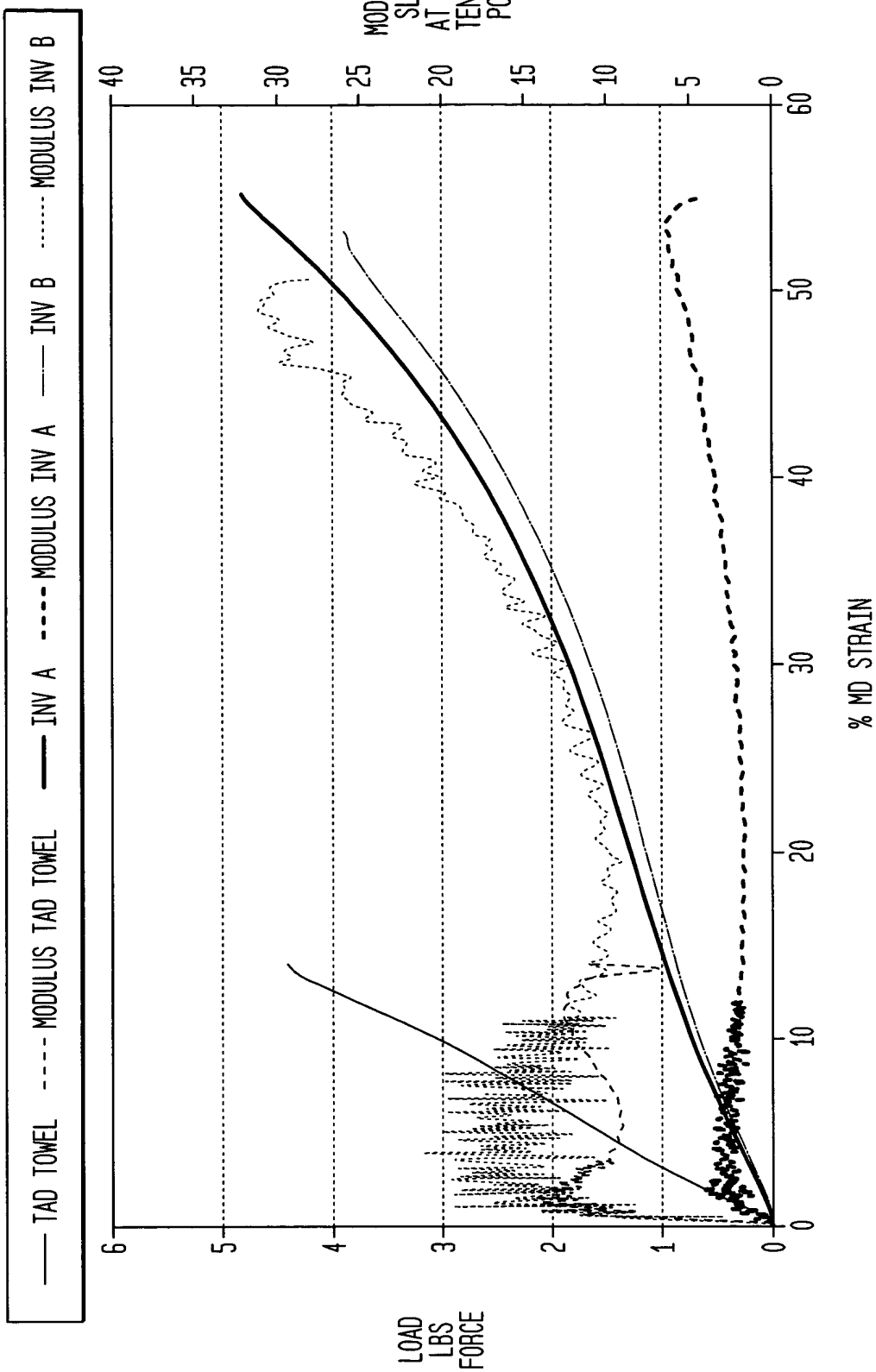

TAD TOWEL
MODULUS TAD TOWEL
INV A
MODULUS INV A
INV B
MODULUS INV B
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% MD STRAIN
0
1
2
3
4
5
6
0
5
10
15
20
25
30
35
40
0
10
20
30
40
50
60

FIG. 54

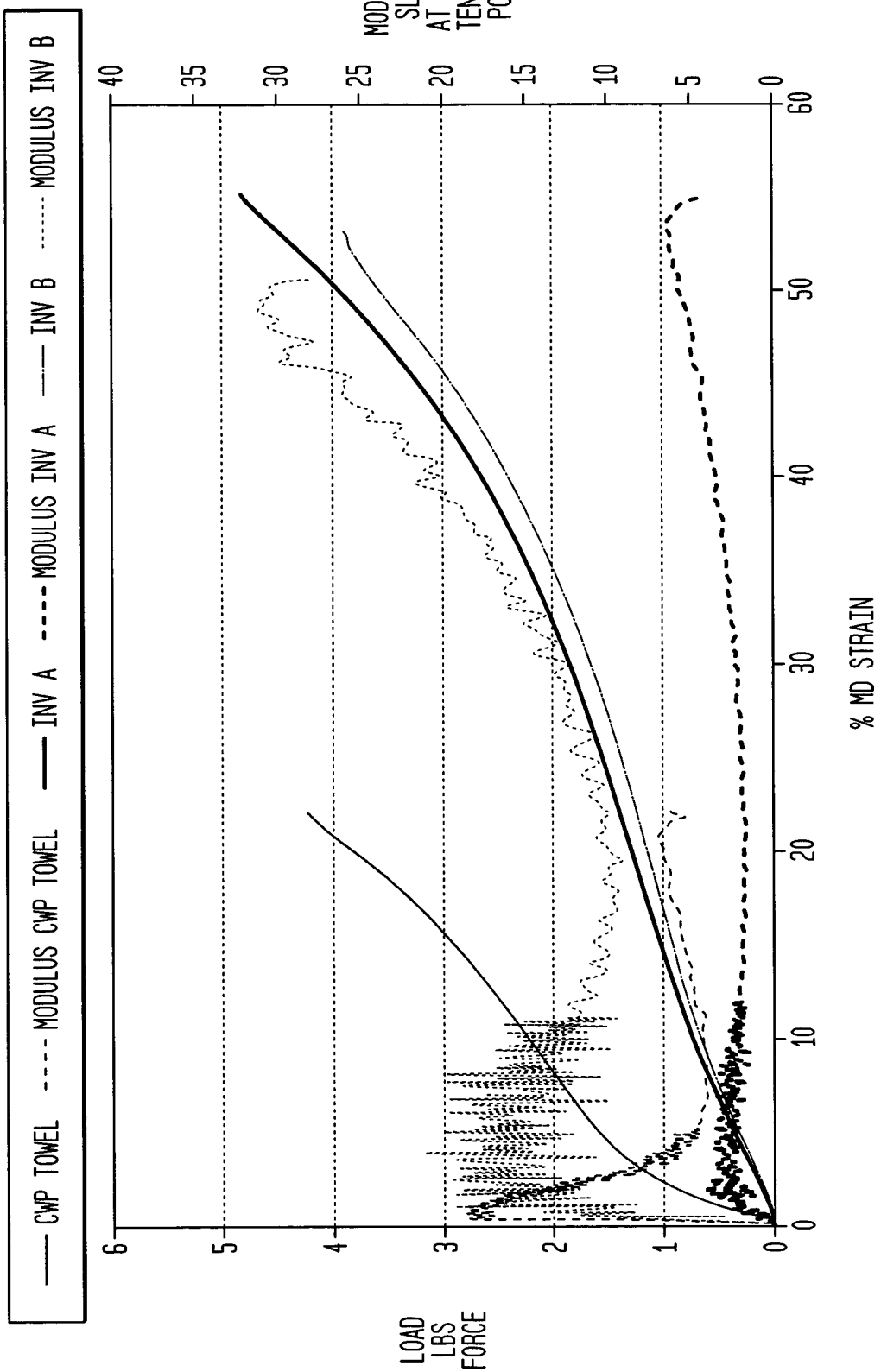
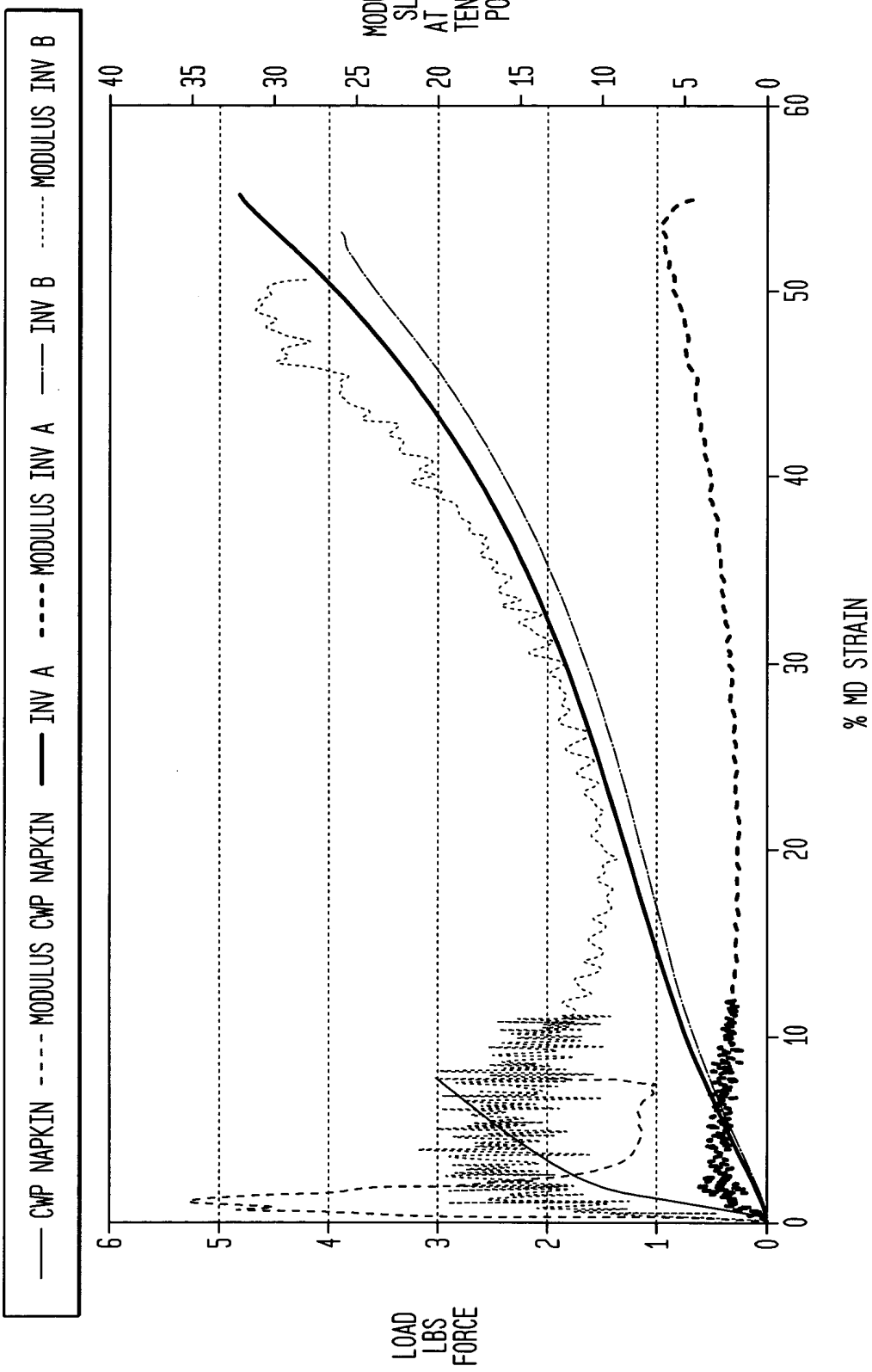

CWP TOWEL
MODULUS CWP TOWEL
INV A
MODULUS INV A
INV B
MODULUS INV B
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% MD STRAIN
0
1
2
3
4
5
6
0
5
10
15
20
25
30
35
40
0
10
20
30
40
50
60

FIG. 55


CWP NAPKIN
MODULUS CWP NAPKIN
INV A
MODULUS INV A
INV B
MODULUS INV B
LOAD LBS FORCE
MODULUS: SLOPE AT EACH TENSILE POINT
% MD STRAIN
0
1
2
3
4
5
6
0
5
10
15
20
25
30
35
40
0
10
20
30
40
50
60